

**33rd
YEAR**

CHEMICAL WEEKLY

VOL. XXXIII

FEBRUARY 2, 1988

NO. 21

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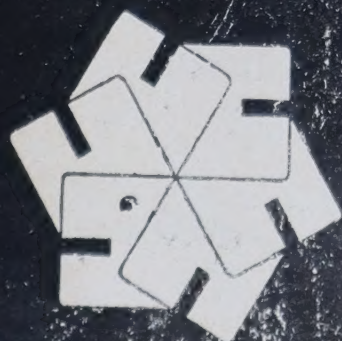
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chemphos

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Alfol 1618-4317

-- German

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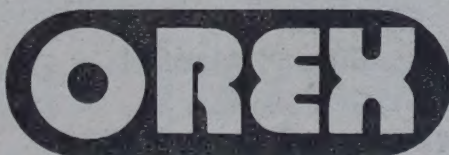
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- MADRAS** : Syndet Enterprises, 90, Govindappa Naick Street, Madras-600 001.
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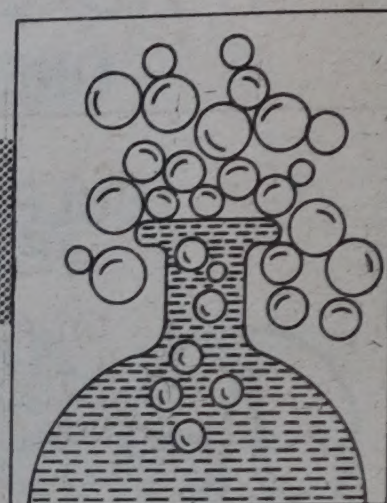
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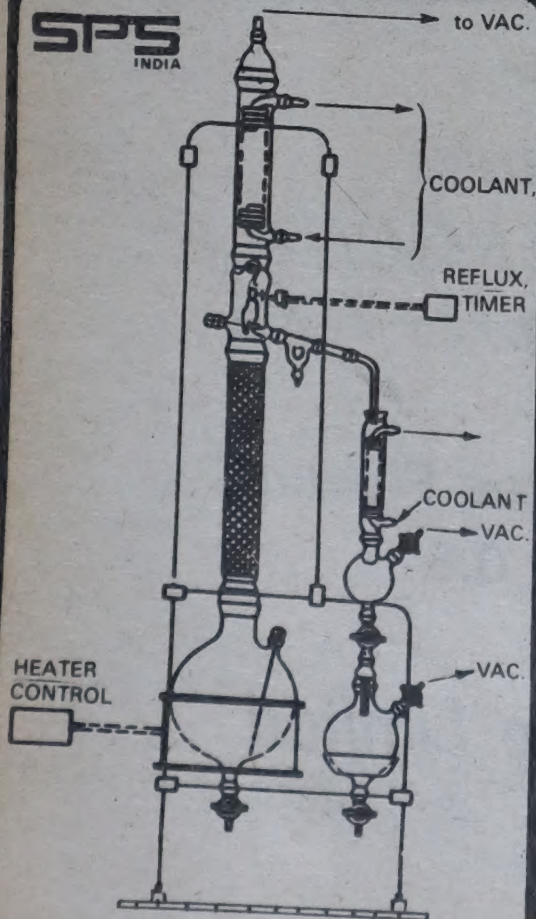
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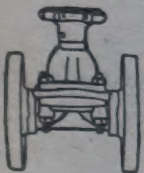
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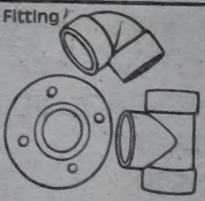
Tel. Nos.: 31-7815/29-2386/25-8137/25-1744 Cable: JAYJANAK Telex: 11-2192 JAY IN
Hyderabad : Telephone Nos. 73604/70408



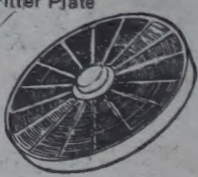
Diaphragm Valve



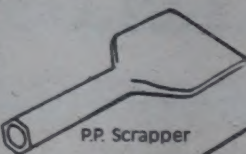
PP Cocks



Pipe Fitting



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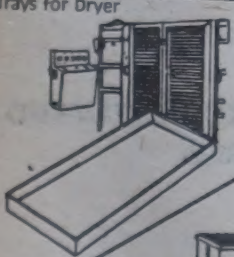
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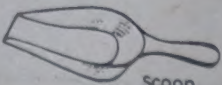
Trays for Dryer



Tank



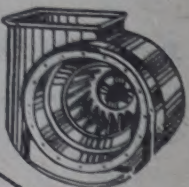
Tank



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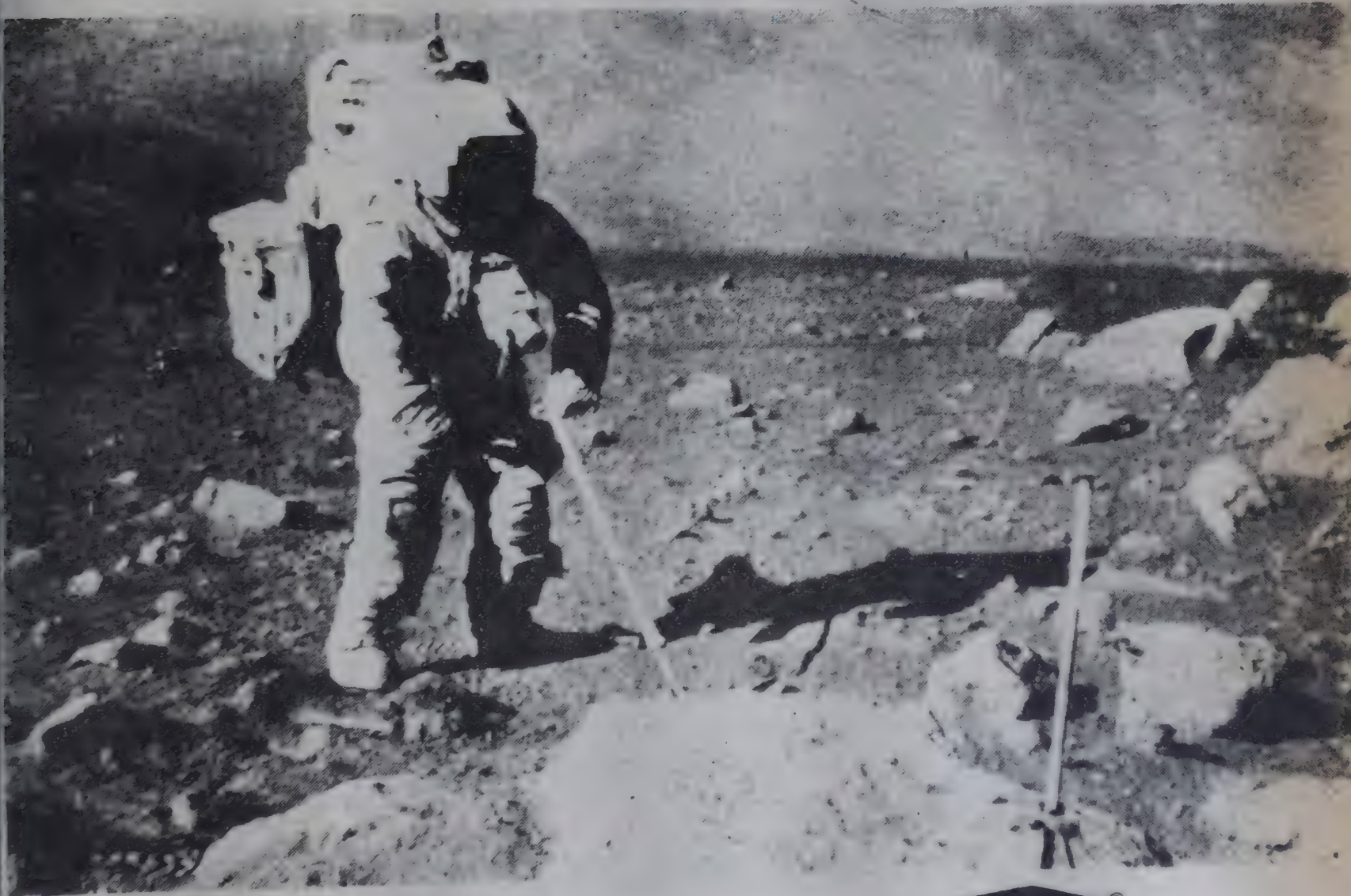
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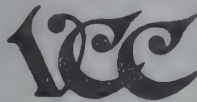
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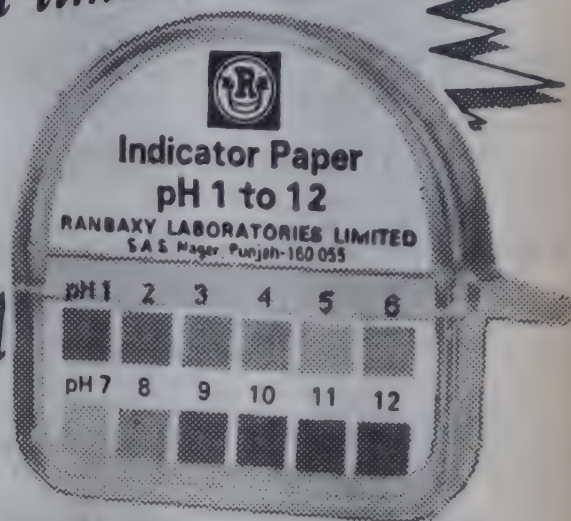
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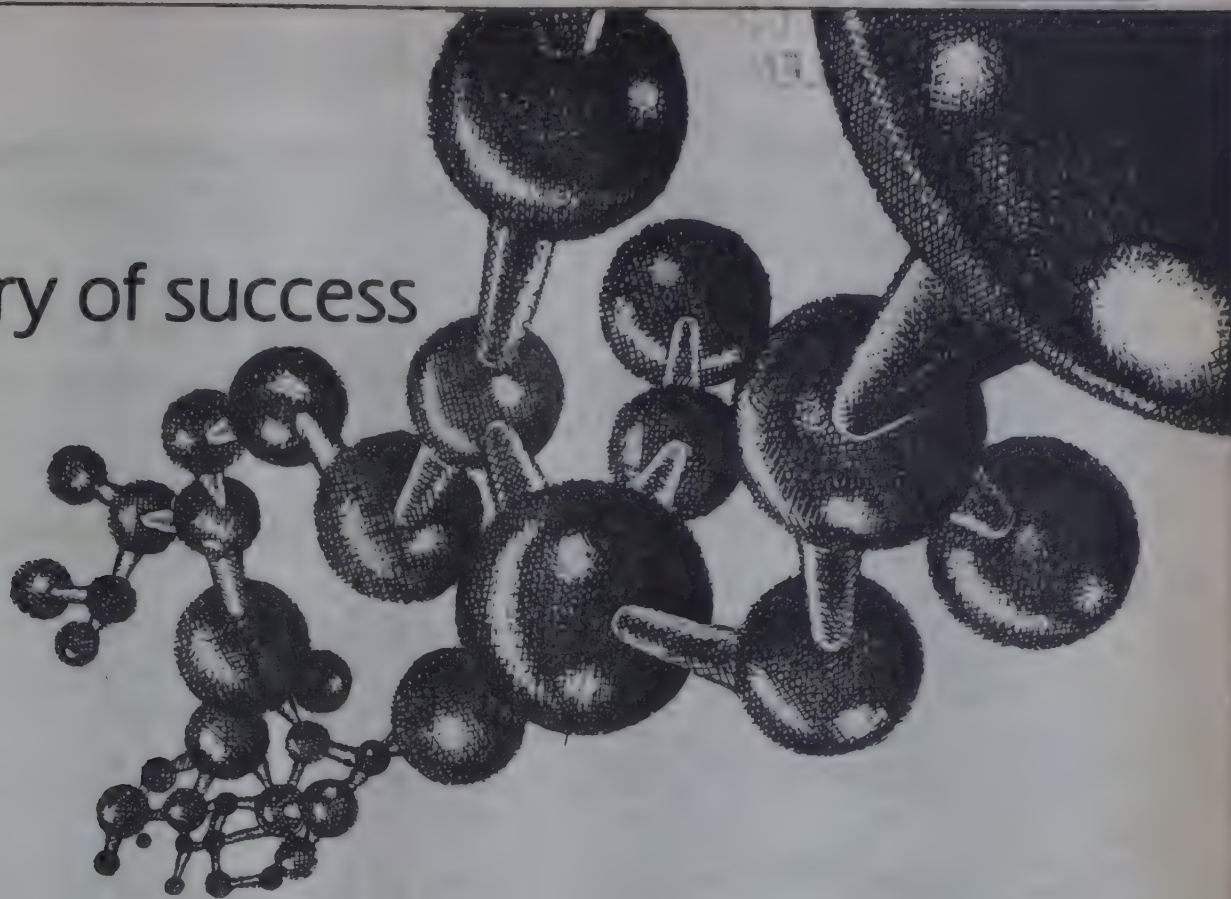
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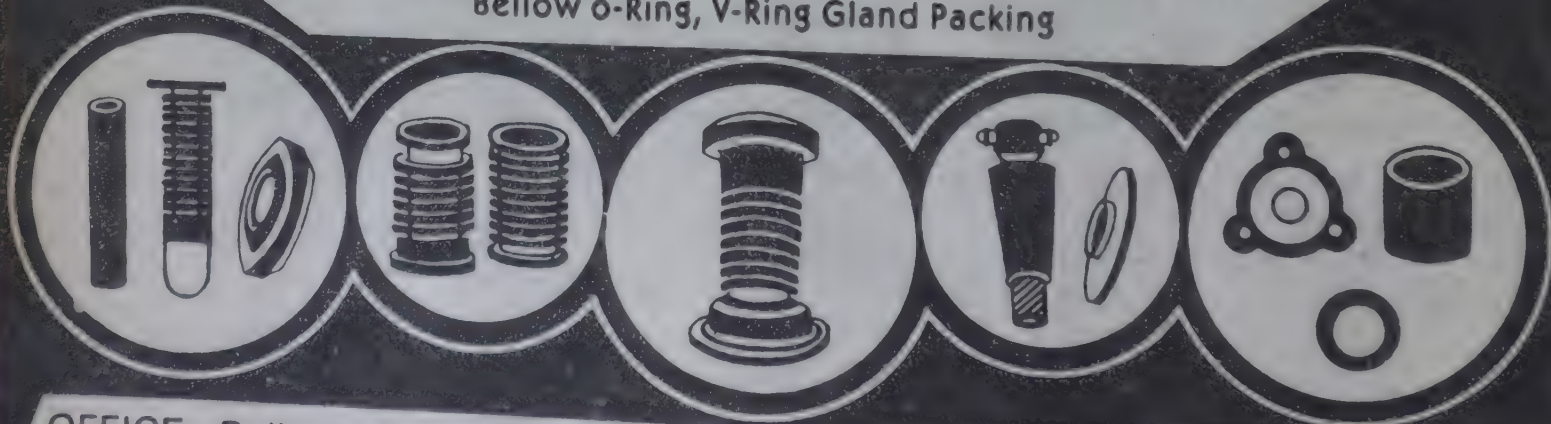
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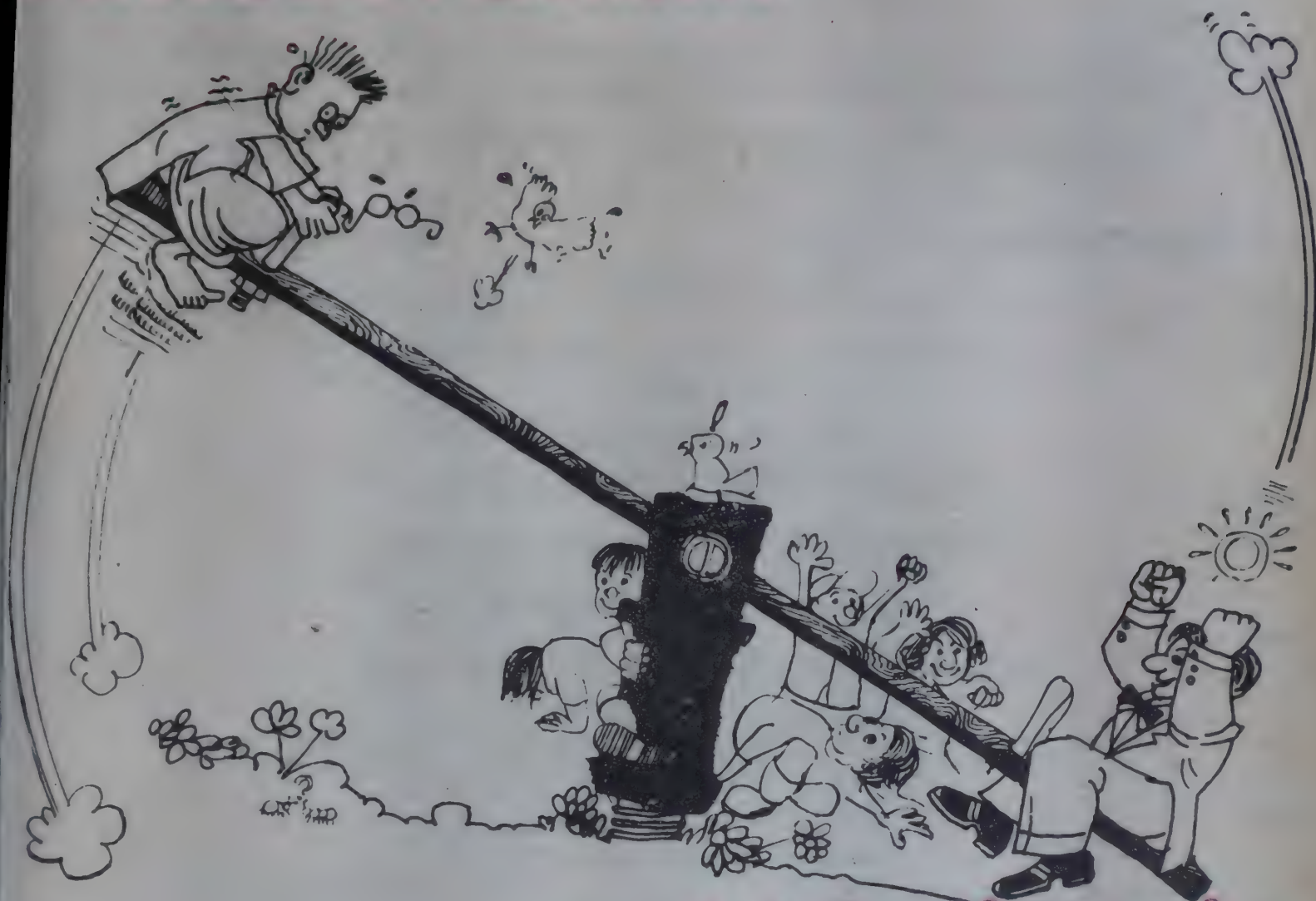
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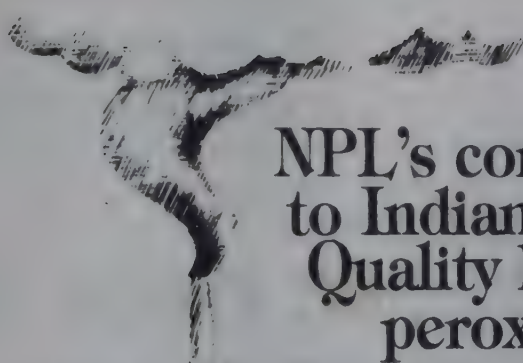
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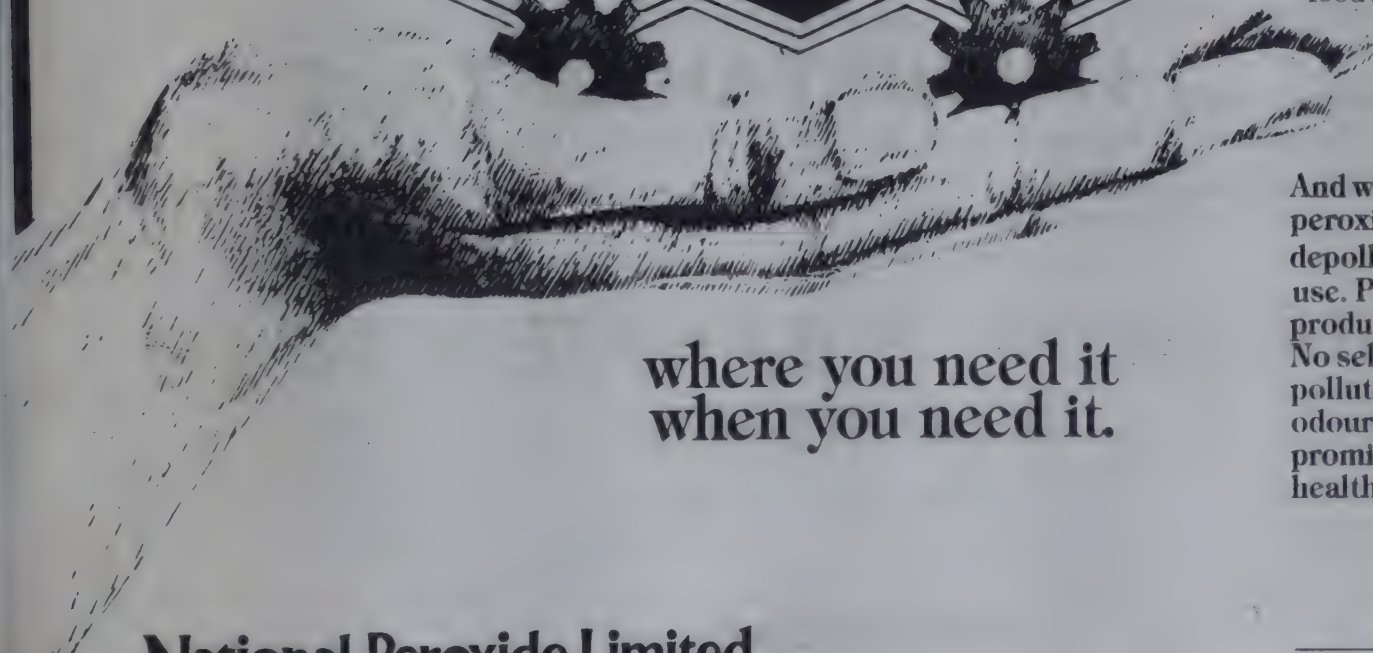
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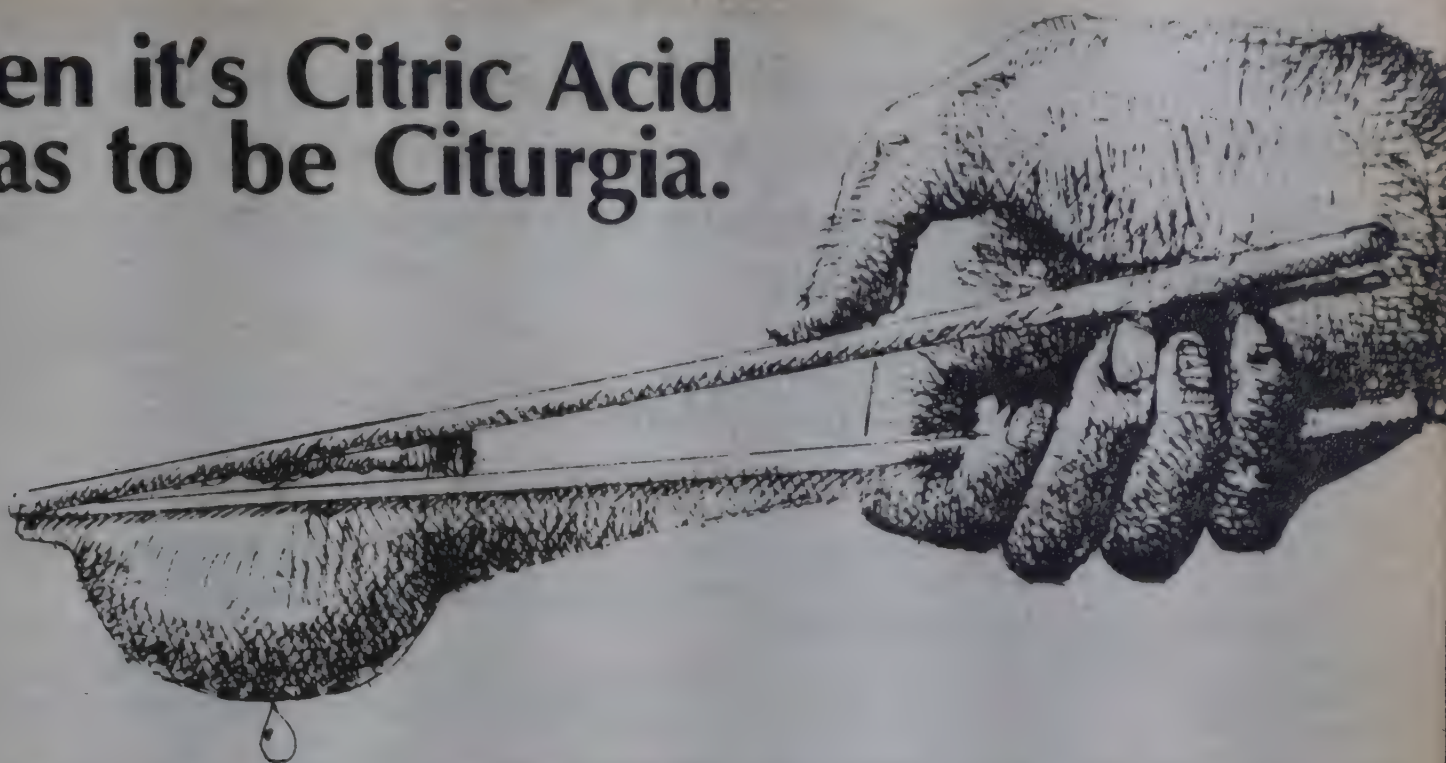
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CHEMICAL WEEKLY

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National Space Programme -- Challenges and Tasks Ahead

The Indian Space Programme owes its origin to the imagination and foresight of a band of young and committed scientists in the Department of Atomic Energy in the early sixties. The overwhelming urge that motivated these devoted visionaries headed by the late Dr. Vikram Sarabhai to take on the challenge of the Space Age was their conviction that the introduction of high technology alone could achieve rapid social development in a poor third world country like India.

The inauguration of the Equatorial Rocket Launching Station at Thumba (TERLS) near Trivandrum in 1963 marked the beginning of India's first attempt at the exploration of space for meteorological and upper atmosphere investigations. The first perspective 10 year plan for the space programme entitled "A profile for the decade 1970-80" outlined the following objectives.

"The principal objectives of the space programme in India are to develop indigenous competence in designing and building sophisticated hardware involved in space technology including rockets and satellites for scientific research and for practical applications and the use of these systems for providing point to point communication as well as a national TV hook up through a direct broadcast synchronous satellite and the application of satellites for meteorology and for remote sensing of earth's resources".

The significant achievements of this decade included the completion of the Satellite Instructional Television Equipment (SITE) the Satellite Telecommunication Experimental Project (STEP) the progress made in remote sensing surveys, the launching of the ARYABHATTA and BHASKARA, and subsequently ROHINI by SLV3 followed by the successful launch of APPLE, India's communication satellite in 1981. The central objectives of the Space Research Profile for the decade 1980-90 have been set out by the Government as under:

"The main thrust of the Space Programme for the eighties will be towards establishing national systems using space technology, for telecommunication, television, meteorology, and remote sensing for effective survey and management of natural resources.

The indigenous development of various application satellites, their payloads and capability to launch these satellites is integral to this objective". Of the nine specific tasks identified to achieve the above objective, special reference has to be made to the following:

(i) To accelerate indigenisation of the spacecraft of the INSAT (Indian National Satellite) System so as to replace the imported First Generation Space Segment of INSAT at the earliest by indigenous Second Generation INSAT Satellite.

(ii) To improve rapidly the technology and payload capabilities of SLVS Launch vehicle, develop variants for enhanced applications, scientific payloads and conduct their launches. A crucial element of this objective is to develop an Indian Polar Satellite Launch Vehicle to place Indian Remote Satellites in polar sub-synchronous orbits from Indian Ranges.

(iii) To develop the existing space technology capabilities by strengthening linkages with academic and research institutions in the country for mutual benefit and

(iv) to plan, conduct and support important space science and technology experiments that would give maximum returns so that India remains abreast with international developments in this field.

The culmination of about seven years of development effort with the launch of SLV3 in July 1980 marked the entry of India into the Space Club putting it among the six nations with satellite launching capacity.

But for the Indian public it was the advent of the multi-purpose Satellite IB launched on board the US Space Shuttle 'Challenger' in 1983 making possible the extensive television and telecommunication network in the country that created large scale awareness of the benefits of the space programme. Functioning at full capacity for the past four years, the ever increasing load on the capabilities of INSAT IB by various user agencies is a clear indication of the areas of satellite application which still require to be fulfilled. The launch of INSAT IC meant as an orbit spare for INSAT IB, has been delayed for the past two years first due to the Challenger disaster and then the grounding of ARIANNE launchers, underscoring urgent need for developing higher payload capacity within the country.

The Augmented Satellite Launch Vehicle (ASLV), the first developmental flight which plunged into the sea off Sriharikota early last year after developing a snag in the first stage motor, was primarily meant to serve the dual purpose of having low cost reliable launch vehicle for placing 150 kg. class satellites in low earth orbits and to qualify a number of indigenous technologies and sub-system relevant for Polar Satellite Launch Vehicle. The review committee set up to enquire into the causes of the above failure has confirmed that the non-ignition of the First Stage rocket, which led to the debacle, was a random phenomenon and not connected with the quality of the materials utilised. The flight of ASLV was only a developmental one and a number of sophisticated equipment used have functioned extremely well and the failure of ASLV-1 need not be the cause of despondency regarding the future or lack of confidence in our R & D efforts.

The Space Department is progressing satisfactorily towards the Polar Satellite Launch Vehicle (PSLV) which is expected to be launched in February 1988 from a Russian Launch Station. But work on the Geostationary Satellite Launch scheduled for 1992-93 is yet to start. Meanwhile an unfortunate and perhaps politically motivated controversy has developed around the proposed launching site for the polar satellite at Balasore in Orissa. The space authorities have clarified that the payload capabilities for this Satellite if launched from Sriharikota would only be one tonne while a launch from Balasore would improve it to 1.7 tonnes. The solution lies in enlightening the public regarding the importance of the project to the nation at large.

The Satellite Instructional Television Experiment (Teacher in the air programme) carved out in 1980s using a loaned satellite amply demonstrated the power of television as an educational medium. Today over 70% of the Indian population has come within the reach of

television broadcasting. Unfortunately there is justifiable criticism that the use of television as a means of entertainment has gained precedence over its use for educational purposes. In a country like India the possibility of using television for updating technological skills of workers for continuing education in urban centres etc cannot be over-emphasised.

Till now, despite emphasis laid on self-reliance and indigenisation, the Indian Space Programme continues to import considerable amount of hardware in the critical areas of materials, electronics, telemetry and instrumentation. With the growing importance of space programmes in maintaining the balances of economic and political power in the world, the access to foreign technological know-how is becoming increasingly restricted. There is no alternative to the development of indigenous skills.

The reluctance of Indian industry to participate in space programme conforms to well established pattern even in foreign countries. Prof. Luest, Director General of European Space Agency has commented on similar attitudes even in European countries "Industry talks normally of time horizons in research and development of six to seven years while in space technology the returns may take ten years and more. Take the first satellite, no one had any idea of what they would be used for." Given the comparatively more conservative attitude of Indian private sector the space authorities may have no option but to depend on their own resources. The environmentalists are the latest critics to enter the space arena. Experts say that just one hundred powerful rocket launches of the Shuttle type one after another can upset the ozone layer with dire consequences for the Earth's biosphere. They are in the field today with a forceful plea to limit the quantity of total rocket launch fuels to 20,000 tonnes per year.

In the two decades since India entered the space age progress, even if halting, has certainly been commendable; we are perhaps the only developing country which can be justifiably proud of our achievements. Of course there are shortcomings and criticisms, which are part of the process of growth. The visionaries of the sixties who conceived India's space programme as the only means of rapid social development of a backward nation have indeed placed a clear objective before us. No one can deny that it is only a successful space programme that can ensure our progress in telecommunications, resource exploration and management, meteorology, mass education, and defence. There can be no national alternative in this crucial and vital arena but to pursue our objectives, with single minded devotion, undeterred by setbacks and shortcomings.

-- T.P.S. RAJAN

CHEMARENA

J.L. VENKITESWARAN

Uncertain Future for Sucrose

Sugar or sucrose, the largest volume pure chemical recovered from natural sources and consumed directly and as a sweetener in food products, has been facing serious erosion in world demand since several years. World consumption is estimated at about 115 million tonnes a year of sugar derived both from sugarcane and beet. There is a fairly large international trade with USA being one of the top importers and paying a higher price too. Latin American countries, especially Cuba, are the largest exporters and have suffered from the unpleasant political relationship with USA. The present surplus stocks due to declining exports is placed at 40% of production and a serious burden on the group of Latin American and Caribbean Sugar Exporting Countries. The demand in US has come down and its import of LA sugar is cut from 3 mill. tonnes of early eighties to a meagre 700,000 tonnes. It is only India which was once surplus in sugar and an exporter has become an importer of nearly a million tonnes -- a real tragic case for a country with the highest sugarcane crop of 180 million tonnes a year and record production of 8.5 million tonnes of crystal sugar last year, together with raw sugar products like gur and khandsari.

The serious situation in sugar has given impetus to the possibilities and potential of sugar as a base for chemicals -- Sucrochemicals. But not much has been achieved nor is there a breakthrough in site for large volume outlets. There is a World Sugar Research Organisation and several top level organisations in the producing countries -- Cuban Institute of Sugar By products for instance. Although India boasts of two or more organisations for training and research, there is no work on sucrose derivative -- naturally due to the country's deficit in sugar. In spite of sizeable sugar imports year after year at heavy cost and under serious balance of payment problems, there is little attempt to reduce wasteful recovery processes from sugarcane which lead to over a million tonnes going up in smoke with the fibre bagasse.

The major erosion in the sugar market was due to the development of HFCS -- High Fructose Corn Syrup from starch via glucose. As glucose is only half as sweet as

sucrose (with the same calorie value) the conversion of glucose to fructose (much sweeter than glucose) by an enzymatic method paved the way for HFCS from the cheap corn or maize. Over 50% of the US market for sugar is taken over by HFCS -- particularly the market for use in beverages and food products. Artificial sweeteners have not cut into the market to any significant extent but sugar intake as such has been cut by many on health grounds.

What is the future for sucrochemicals -- a field of much academic interest but economically a failure so far? Value-added products over a raw material of rather high price do not provide volume outlets. Sugarcane provides several by-products and of these the waste molasses containing about 50% sugars left uncrystallisable is a source of ethanol, yeast, citric acid, lysine and some other chemicals. Ethanol is the largest volume item. Molasses also finds use in cattle feed mixes and use for cattle feed have been growing at over 10% per year in Western Countries. Lysine is probably the largest volume cattle feed additive, derived by microbial conversion from molasses. Ethanol for use as a fuel component is a good outlet for sugarcane juice as such or of enriched high test molasses but certainly not as a product for which one would start from sucrose. The market as fuel component is very large but require subsidies from the state and this is no real solution.

Brazil, one of the largest sugarcane producers, has a policy framework by which the quantities of sugar and ethanol produced from sugarcane are suitably adjusted according to demands and the ethanol used as a fuel for automobiles, both as a mixture with petrol and as a 'neat' fuel as such in specially designed car engines. USA also uses several thousand million litres of ethanol in gasoline mixes but the ethanol is derived from corn which is more abundant than sugarcane in USA. European countries have not taken up any programme for fuel use of ethanol due to the subsidies required. The era of high priced petroleum is yet to make its impact after an initial shock in the early eighties. The elimination of TEL as a gasoline additive gives scope for alcohols as a gasoline additive to boost octane but here too

the methanol-based MTBE is preferred on economic considerations.

The largest sugar producer of UK, Tate and Lyle, has been one of the pioneers in sucrose conversion with years of R & D since sixties. Their chief says "In the 1970s we were doing a lot of work on fine chemicals based on sucrose and other carbohydrates". They commercialised two products, sucrose fatty acid esters for use as surfactant and food emulsifier and xanthan gums. But neither of these have been a success and the gum technology was sold off to Kelco, a subsidiary of Merck and this is being produced and marketed to a limited extent.

The sucrose ester is too costly and use is confined to special areas. Tate & Lyle have since switched to food areas with less emphasis on fine chemicals, especially chemicals which can be made through enzymatic methods. In fact, sucrose can be converted into high fructose syrup but cannot match the price based on corn starch -- largely because of the initial cost of sugar.

Sucrose polyester (SPE) with a long chain fatty acid has also been synthesised by Proctor and Gamble and touted as a low calorie fat and cholesterol reducing agent. It is not digestible and passes through the human system but SPE is said to grab some cholesterol on the way. But again this could at best be a very small outlet.

Another firm which has been engaged in this endeavour of sucro-chemicals is the Finnish Sugar Co. When sugar consumption levelled off in the seventies the industry had to look to other outlets but could not find any easy way out. Finn Sugar's efforts took then to xylitol (also a sugar but a low calorie one) and fructose (competitively to corn based production). Both are low volume outlets even if competitive. Biotechnology appears an obvious way as carbohydrates are invariably raw materials or substrates for fermentation.

Incidentally sucrose is a major input for penicillin fermentations where the original use of lactose has been displaced. Biotechnology is only a way to products and the useful product and an appropriate organisation to produce it has to be found. "If you know the science and your strengths you can find nice niches" remarks their

Director of Development. Finnsugar took over a penicillin plant in Finland which was unable to compete in world markets and the product chosen was gluconate -- the simplest item and well-tried technology. Finnsugar claim to have a few more products on line and are on the look out for new enzymes and new applications of available research.

Finnsugar also teamed up with Swedish Sugar to form Carbohydrates International. The objectives of CHI is looking at new lines. Swedish sugar also formed another joint venture with a pharmaceuticals firm Kabivitrum, to explore new carbohydrates. Bacteria attach in certain ways to specific carbohydrates and this helps to work out ways of identification of infections of respiratory or urinary tracts. "Receptor" sites are said to be specific carbohydrates and diagnostic agents can be developed -- first product is said to be a diagnostic test kit for cystitis.

These are only nominal side outlets of no quantitative significance and focus has to be on enzymes for organic chemical synthesis. Nothing tangible has come up. Carbohydrates provide the differences in blood groupings -- A and B have tri-saccharides while O group has a disaccharide. CHI has also not much to provide by way of significant products based on sugar. Sugar is the best base for Lactic and Citric acids and the production of these is economic and well established but with a limit on outlets. But as with ethanol, they can be easily based on the byproduct molasses and so provide no alternate outlet for sucrose. The sucrose esters are the best hope if better low cost enzymatic methods can be developed. Some polymers have been suggested and developed, for example, a Hydroxy Butyric acid-based polymer. But these items or xylitol or xanthan are only minor outlets.

India has to look ahead in a 10 to 20 year framework for the future of the Indian sugar industry and for sugarcane. The importance of the fibre of sugarcane for paper and newsprint is no longer in doubt and major programmes have to be oriented towards paper and newsprint with the juice itself being diverted to chemicals -- ethanol being the easiest intermediate to choose. Food products like yeast proteins have also high potential.

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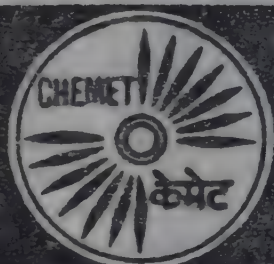
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NAPHTHA DERIVATIVES:

Decision on deemed export supply soon

A decision on deemed export supply of naphtha derivatives like benzene to the chemical industry for export production is likely to be taken at a meeting called by the Joint Secretary for Petroleum and Natural Gas in New Delhi on January 27.

The State Trading Corporation (STC) was given a licence more than a year ago to import solvents like benzene, xylene, toluene and naphthalene to be supplied at international prices for export production of value-added petrochemicals.

But the licence could not be implemented because of what the industry calls the 'chicken and egg' situation. Naphtha derivatives like benzene are subject to violent price fluctuations in the international market. Because of this, potential exporters were hesitant to make purchase commitments without knowing the price they would have to pay.

In the absence of an undertaking from consumers to lift supplies irrespective of prices, STC was reluctant to place orders. Another reason is the lack of adequate storage facilities for such hazardous materials in Bombay, where most of the consumers are located.

The current international price of benzene is around Rs. 2,500 a tonne. Only six months ago, the price had shot up to Rs. 8,000, prompting Shell to make enquiries about its availability from Indian manufacturers.

At the meeting it is understood that STC will plead for deemed export supply of the material by indigenous producers. If the proposal works out, it will mean supply of naphtha at negotiated prices to indigenous producers (Nocil or IPCL) who in turn will supply the intermediates to exporters.

Nocil has shown considerable interest in assisting exporters and has offered supply of four intermediates (ethylene oxide, isopropanol, polyethylene glycol and dichloroethene) at negotiated prices, in return for deemed export status for its supplies. In contrast, IPCL has shown no interest in assisting exporters, according to industry sources in Bombay.

If supply of intermediates by either Nocil or IPCL does not work out (refin-

eries may oppose supply of naphtha at reduced prices), the only alternative would be for the STC to import the material.

The Indian Oil Corporation (IOC) exports naphtha at Rs. 1,500 a tonne, while several petrochemicals like MEG (used in the manufacture of synthetic fibres) made out of naphtha derivatives are imported into the country at high value-added rates.

As against the international price of around Rs. 1,500 a tonne, IOC supplies naphtha to local petrochemical industry at Rs. 3,400 a tonne. This has contributed to the high cost of petrochemicals in the country and loss of an estimated Rs. 1,000-crore export market where the Indian industry finds itself hopelessly out-priced by rivals like Japan and South Korea who, ironically, import Indian naphtha. "The net result is that the public sector refineries have impressive balance sheets at the cost of the country's exports", the director of a city firm said.

Mr. Ramu Deora, Chemexcil Chairman and the President of the Federation of Indian Export Organisations (FIEO) has advocated supply of petrochemical intermediates by Indian companies for export production by evolving a scheme akin to the International Price Reimbursement Scheme (IPRS) in the case of steel industry. "Because of the delay in implementing the scheme, third country exports are becoming at the cost of our country's exports and employment opportunities," he told Financial Express. He also pleaded for permission for supply of raw material by one advance licence holder to another.

He advocated preferential supply of all raw materials for export production, be it chemicals, textiles or engineering goods. This will not only increase our exports but reduce the import bill by Rs. 3,300 crores, he said. "All export promotion councils (EPCs) are today facing the same problem of raw materials and the Government should rectify the anomaly at the earliest," Mr. Deora said.

"Exporters have time and again pointed out the anomaly of higher import duty on intermediates and lower duty on finished products", he said. Unless this duty structure is altered, production of end-products for exports will not get

the kind momentum which is the need of the hour, he said.

PDIL WINS NITRIC ACID PLANT CONTRACT AGAINST STIFF COMPETITION

PDIL has been selected as the Prime Engineering Consultant by M/s. VBC Industries, Visakhapatnam, a leading multiproduct manufacturing organisation in private sector, for design and execution of their proposed 80 TPD Nitric Acid Plant and offsite facilities to be installed in Srikakulam district of Andhra Pradesh. PDIL has secured this order under stiff global competition from reputed overseas process licensors. The plant will be based on PDIL's own indigenous technology incorporating the latest techniques for energy saving and pollution control to meet the MINAS. The contract between M/s. VBC Industries and PDIL was signed at Hyderabad on December 9, 1987.

PDIL's scope of services covers total consultancy including design, engineering, procurement assistance, inspection, monitoring and scheduling, construction supervision and trial run and commissioning of the plant. The project is expected to be commissioned within 24 months schedule.

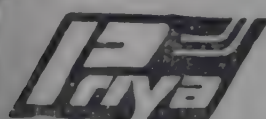
PDIL has earlier successfully designed and executed Nitric Acid Plants with varying capacities for SAIL, Rourkela (820 te/day), DGOF, Kirkee (20 te/day), DGOF Bhandara (20 te/day) and HFCL Haldia (500 te/day). The Nitric Acid Plant (35 te/day) of M/s. Deepak Nitrite Ltd., Baroda, was also built with PDIL's know-how and design.

PDIL is the only organisation in India which possesses its totally indigenous and commercially proven technical know-how for design engineering of Nitric Acid Plants.

NALCO EXCEEDS PRODUCTION TARGET

The central sector, National Aluminium Company Limited (NALCO), closed 1987 with production of 11,562 tonnes of aluminium against the target of 11,500 tonnes.

Its eight-lakh-tonne refinery, located at Damanjodi in Koraput district, produced and despatched about 70,000 tonnes of alumina during the year. Besides, the domestic sale of alumina hydrate and calcined alumina amounted to 2,000 tonnes, a NALCO press release said.



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Frankly Speaking

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(An author of repute and a visiting professor, Dr. Kharbanda consults worldwide including to UNIDO.)

Genetic Engineering—Applications

Considerable amount of research work is proceeding simultaneously in many centres around the world in the comparatively new discipline of genetic engineering and biotechnology. Some of this work is getting translated into practical applications and it is instructive to look at some of these in the medical area.

The US drugs company, Schering-Plough, is on the verge of commercialising alpha interferon with the cloning of two more gene-spliced proteins which promise to have broad applications in cancer therapy as also in treatment of infectious diseases. The biotechnology group, Porton International, is developing an antiviral compound which promises to be several times more active against the AIDS virus than other drugs. The company's work on a gene-probe diagnostic to detect AIDS viral antigens has also reached an advanced stage. Welcome (UK) is expanding production of its potential AIDS treatment drug, AZT, which is to be supplied by the company free for treatment trials. Meanwhile, US health officials have set up clinical tests for the drug. Oncor has developed a blood test to detect the AIDS virus through the use of a radio labeled RNA fragment of genetic material.

A possible vaccine against Rocky Mountain spotted fever seems within reach at the National Institute of Allergy and infectious Diseases. This tick-borne disease destroys cells of the vascular system, leading to low blood volume and fluid-swollen tissues. The British firm, Delta Biotechnology Ltd. plans to produce saleable proteins such as human serum albumin from yeast after it has performed its initial task of generating ethanol for the brewing industry. Delta is a collaborative effort between Bass, one of Europe's leading brewery in terms of R&D, and Cavendish Technology Partnerships Ltd. specialists in recombinant DNA blood products. The company also maintains close ties with MIT, Ox-

ford and Cambridge Universities. The proposed patented process, which will be limited initially to totally inert proteins, has no effect on the basic brewing process or the quality of the beer.

The trick is to modify the bacteria genetically so that genes coding for the desirable proteins remain silent until triggered and expressed in a process separate from brewing. This safe and convenient method will be applied to a variety of therapeutic proteins and modified animal feed products.

The area of clot-dissolving drugs has, naturally attracted considerable attention. Genetech is to start soon production of its tissue plasminogen activator product, TPA, which is likely to face fierce competition in the non-European market, but the European market (estimated at some \$200 million including the conventional drugs) is likely to be dominated by Beecham by virtue of their lead in and intimate knowledge of this market. In order to protect for itself the non-European market, valued at some \$600 million, Genetech is suing competitors seen to be producing TPA using its own patented process. Both TPA and Eminase have similar clinical profiles and have significantly better potency rates (85-90%) over the conventional urokinase and streptokinase drugs (55% success rate). TPA is also seen as an aid against lung clots. Some of the other interesting and exciting possibilities include:

- * A new DNA (deoxyribonucleic acid) for early diagnosis of malaria.
- * Safer whooping cough vaccines—Merck Sharp and Dohme.
- * DNA fingerprinting used for forensic tests. Life-codes (USA) test identifies persons according to genetic information in cells.
- * Techniques used against transplant rejection—Cambridge University has tested it in mice receiving bone marrow transplants.

AVY VEHICLES :

Proposal to make diesel, methanol mix mandatory

The Government is studying a proposal which will make mixing of methanol with diesel compulsory for heavy vehicles.

The move is a follow-up of a study conducted by the Indian Institute of Petroleum. The Institute, which has carried out extensive trials, is believed to have recommended it.

If implemented, India will join the ranks of select countries like the US and Japan which have similar regulations.

The proposal will most likely be opposed by the public sector oil refineries as it will affect their diesel offtake and spill their profits. It will also mean an increase in methanol consumption to an estimated 16 lakh tonnes a year.

Since last January, the US has enforced mandatory mixing of methanol with diesel to reduce air pollution. In Japan, methanol is mixed with diesel and ethyl alcohol with petrol.

A major factor which may influence the decision in India is the high price of methanol in the country. Methanol currently costs around Rs. 4,500 a tonne which, with various levies, adds up to almost Rs. 5,000.

Till recently, methanol was in short supply. Against an annual demand of 1,21,000 tonnes, the four indigenous producers (RCF, GNFC, National Fertilisers and Assam Petrochemicals) together produced 79,500 tonnes. The State Trading Corporation used to import the balance. However, STC curtailed its imports because Rama Petrochemicals was expected to go on stream in December last. Due to a delay in obtaining Government clearance, Rama Petrochemicals had to postpone its commissioning, leading to a shortage of the commodity for the last two months.

With the start of commercial production by Rama Petrochemicals in February, the entire requirement of methanol will be met by indigenous suppliers.

Manufacturers are gearing up to face an excess production of methanol in 1988. The total production of RCF (37,000 tonnes), Assam Petrochemicals (40,000 tonnes), Na-

tional Fertilisers (16,500 tonnes), GNFC (20,000 tonnes) and Rama Petrochemicals (55,000 tonnes) will touch 1,68,500 tonnes. Synthetic fibre manufacturers who consume DMT will produce another 50,000 tonnes of "by-product methanol" which is good for almost all uses except pharmaceuticals.

Methanol production in the new year will thus touch 2,18,500 tonnes as against a projected demand of 1,93,440 tonnes. The market sources expect the price to go down to around Rs. 3,000 a tonne by the year-end as a result of excess production and competition.

An additional capacity of 3,33,000 tonnes has been licensed. This includes Assam Petrochemicals (33,500 tonnes), GNFC (80,000 tonnes), FCI (16,500 tonnes), NFL (33,000 tonnes), Ashok Chauhan (1,00,000 tonnes) and Assam Gas Company (1,00,000 tonnes). Two more units

have been registered — Deepak Nitrite (1,00,000 tonnes) and Rajasthan Industrial Development Corporation (1,00,000 tonnes).

The Government has fixed the minimum economic size for methanol at one lakh tonnes per annum. It is understood that the Government favours production of methanol from natural gas in preference to naphtha, with a view to bringing down the cost of production.

If the proposal for use of methanol by heavy vehicles does not work out, there will be a huge surplus in a few years. If that happens, the Government has expressed its willingness to work out an export strategy by 1992, including supply of natural gas at concessional prices and CCS, to enable Indian manufacturers compete in the international market.

Methanol price in the international market has shot up from \$128-135 to \$173-178 c.i.f. in recent times. The price rise is attributed to two factors — closure of uneconomical units in Europe and the increased consumption in the US following its use in automobile fuel.

— Financial Express

FOR MOST COMPETITIVE CIF OFFERS FOR :

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LEATHER PRODUCTS:

Industry poised for export boom

The Indian leather products industry is poised for a big boom on the export front. Briefing newsmen on the forthcoming 'Leathervision '88'. Mr. S. S. Sawhney, president, Indian Leather Products Association (ILPA), said buyers in the West are increasingly exploring purchase possibilities from India as rival exporting countries like Taiwan, South Korea and Latin American countries, are facing increasing problems of labour scarcity, spiralling wage rates and increasing opposition to pollution.

The above factors together with the fact that the Indian industry is fast modernising itself with a consequent up-trend in quality, Mr. Sawhney said, spells well for its future. In fact, the 'made in India' label, hitherto a misnomer, is also finding acceptance, albeit slowly, in the international retail markets. Canadians, for one, have accepted Indian brands with enthusiasm. Besides, he said, various design centres are coming up in the country to cater to the changing fashion demand of the export market. International designs change at least twice a year, he added.

Although presently the Indian industry only accounts for a meagre 1.35 per cent of the world market, estimated at Rs. 17,230.82 crores, there has been considerable success in exports. Exports of leather products rose to Rs. 477.89 crores in 1986-87 from Rs. 345.24 crores in the previous year. During the first six months of the current financial year, exports registered Rs. 298.65 crores. This is especially commendable as the Indian leather industry has only been on the export scene for the last 10 years.

Mr. Sawhney expressed confidence that exports would reach a level of Rs. 1,300 crores by the end of the current plan when leather products are expected to comprise 90 per cent of the total exports from the leather sector. Presently, this share is 51.3 per cent. He said the industry was aiming to capture at least three per cent of the world market in the near future.

In this context, Mr. Sawhney pointed out that since the shortage and high pri-

ce of finished and semi-finished leather, the basic raw material, was the major constraint faced by the industry, there should be some move to discourage raw materials exports at the expense of the value-added leather industry. In 1986-87, Rs. 452.89 crores worth of finished and semi-finished leather was exported. The industry is totally sold out on the exports front at present, he said and added that value-added items fetch significantly higher prices in the international markets. While shoe uppers, for instance, fetch twice the price, complete shoes command four times the price compared to semi-finished leather prices.

Talking about Leathervision '88, Mr. Sawhney expressed confidence that the show this year would turn out to be even more successful than the last Leathervision which generated additional business worth \$2 million. Stressing the need for buyer-seller meets, he said Leathervision will not only help to bridge the gap between the international dictates of fashion and style and the supply capabilities of Indian manufacturers, but also bring about a closer interface between buyers and exporters.

PLEA FOR DUTY FREE LEATHER EXPORT

The leather industry has pleaded with the Union government to allow duty free import of all types of leather without any delay for augmenting raw material availability.

According to top industry sources, the limit on exports based on domestic raw material resources would be reached very soon and the current tempo in growth would be impeded if all restrictions on import of any kind of leather, including leather from skins of sheep, goat, pig and other animals were not lifted.

The sources said a difficult situation could rise in regard to availability, if exporters continue to compete with each other for the indigenous leather, thereby inflating the demand for it and pushing up its price. A rise in raw material prices could be avoided if exporters

looked for possible sources of supply abroad for semi-finished leather, crust leather and even finished leather.

There was also the possibility of hides and skins becoming scarcer in the next year because of drought conditions in different parts of the countries. Apart from animals having been slaughtered for want of fodder, there had been a tendency to kill very young animals a fact which had been confirmed in the nation-wide survey conducted by the Central Leather Research Institute recently. All these pointed out to a very difficult situation with regard to supply in the short run, the sources said.

The export performance of the industry in the first half of the current year had been encouraging with an export of Rs. 532.70 crores compared to Rs. 406 crores in the same period last year recording an increase of 31 per cent.

The sources said all indications point to continuance of the growth trend and the year might close with exports from the industry crossing Rs. 1000 crores.

Normally a rising export trend coupled with larger export of value added items should augur well for the future of the industry.

BRITISH POLLUTION CONTROL EQUIPMENT FOR INDIA

A range of air pollution control filters for fertiliser, petrochemical and chemical plants will be promoted by a British company visiting India with the Birmingham Chamber of Commerce trade mission from 9 to 19 January.

Begg, Cousland & Co. Ltd., of Glasgow, which also makes filters for the offshore oil and general process industries, exports 60 per cent of its £2.2 million turnover. Its range of filters can be applied to gas turbine inlets, humidifiers, compressed air and gas systems, refinery vacuum towers, evaporators and distillation equipment.

The filters not only prevent pollution but can save money. For instance, one can recover an expensive and very corrosive solvent burned off in the process of making vinyl wallpaper.

Founded in 1843 when it specialised in wireworking, the firm's more advanced products include hydrophobic fibre filters used to recover very fine mist particles from gases.

Technical sales director, Les Worrall will represent the company on the trade mission.

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The schroff memorial national award for 1987

The admirers and friends of late Prof. Mahadeval Schroff instituted a National Award under the auspices of the Indian Hospital Pharmacists' Association, New Delhi. Prof. Schroff is known as the Father of Pharmaceutical Education in India.

The Award is conferred every year to an outstanding member of the profession of pharmacy-hospital pharmacist, teacher, scientist, journalist, administrator, manufacturer and distributor of medicines — for one's contribution in his respective field and around development of profession of pharmacy. The Award comprises of a Citation, a Memento and the good-wishes of pharmacists of all walks of life.

Shri Ramanbhai B. Patel, Chairman and Managing Director, Cadila Laboratories (P) Ltd., Ahmedabad, has been selected for the Schroff Memorial National Award for the year 1987 in view of his outstanding contributions to the pharmaceutical industry, research and community of pharmacy. His initiative and innovative approach has been instrumental in developing more than twenty bulk drugs for import substitution and an indigenous process for the manufacture of an oral anti-diabetic drug, GLIBENCLAMIDE, which has earned the President of India's 'Import Substitution Award'.

Shri Ramanbhai B. Patel was decorated with the Award at the inaugural function of the 39th Indian Pharmaceutical Congress at Madras.

SEMINAR ON "PLASTICS — MULTILAYER FILMS & STRETCH BLOW CONTAINERS STORMS PACKAGING WORLD"

The Society of Plastics Engineers (SPE), Indian Section along with AIPMA will hold a day long National Seminar on Friday, 12th February, 1988, at Hotel Palm Grove, Bombay.

The Seminar registration fee would include lunch, tea and coffee, and copies of technical papers. The registration fees are as under:

- (a) Registration before 20-1-1988
Rs. 200/- per delegate
- (b) Registration after 20-1-1988
Rs. 250/- per delegate
- (c) Registration for SPE Members
Rs. 150/-

Members desirous of participation in the seminar may please contact: Prof. S. P. Potli's, Vice-President, SPE, Indian Section, Department of Chemical Technology, Matunga, Bombay-400 019.

IMPORT-EXPORT PASSBOOK SCHEME BEING STREAMLINED

The import-export passbook scheme introduced by the government in 1986 to help manufacturers-exporters, is expected to be streamlined further under the new import-export policy to be announced on April 1.

The commerce ministry concedes that the passbook scheme has not come up to the expectations. It is, therefore, proposed to rationalise the scheme keeping in view the experience gained so far.

The chief controller of imports and exports (CCI and E) issued 192 passbooks valued at Rs. 64 crores during April-October 1987.

For quite some time, import-export passbooks could not be issued to manufacturers-exporters because of inordinate delay in printing at the National Security Press, Nasik.

This scheme was announced by the government on April 12, 1985, as part of a three-year import-export policy covering the period April 1, 1985 to March 31, 1988. But the commerce ministry took considerable time to put it in operation. In the light of experience gained, its scope was widened to cover more items.

This scheme is designed to simplify systems for export output by eliminating procedural delays. Broader in its coverage than the advance licensing scheme, it was formulated to assist regular registered manufacturers-exporters to obtain their imported raw materials requirements duty-free to suit their production programmes and delivery schedules.

The passbook eliminated the need, on the part of manufacturers-exporters, to apply repeatedly for advance, imprest and replenishment licences. The passbook is to serve as a single, all-purpose duty-free import licence.

The eligibility is restricted only to registered manufacturers-exporters who have been in production and regularly exporting for a minimum period of

three years and are otherwise eligible for the issue of Import licences.

PLEA TO CHANGE DUTY PATTERN ON HDPE

The All-India Flat Tape Manufacturers Association (AIFTMA) has urged the Government to change the duty pattern from the present valorem to specific rate on high density polyethylene (HDPE).

According to a press release issued by AIFTMA in New Delhi recently, the industry is facing acute financial constraints in view of the hefty rise in the prices of imported raw materials. The landed price of raw materials had nearly doubled from Rs. 22,000 in September 1987 to Rs. 42,000 by January 1988 — in an interval of five months.

The release said though the Government has reduced the duty from 160 to 127.5 per cent ad valorem in September, it had failed to give the proper impetus to the industry in view of further rise in the price of raw materials but the industry could not increase the prices of its products and risk losing the market.

The Association has requested the Government to give cash compensatory support on export of HDPE woven sacks. This would enthruse the industry to export.

Besides, fixation of duty drawback on the basis of excise duty of HDPE would increase exports.

These steps would help the industry to increase its capacity utilisation from the present 23 per cent to at least 50 per cent.

PERSONALITIES

SHRI A. G. BHANSHALI

Shri A. G. Bhanshali has been unanimously elected as the President of the Indian Chemical Merchants Manufacturers Association for the years 1987 and 1988.

Shri Bhanshali is the Managing Partner of M/s. Chemicals & Instruments Corp., 55, Ezra Street, Calcutta, a firm dealing in laboratory and industrial chemicals. He had also been the President of the Association in the year 1983 and associated with many social organisations.

International Symposium on Batteries and fuel cells

The Division of Batteries and Fuel Cells, Central Electrochemical Research Institute, Karaikudi is organising an International Symposium on Batteries and Fuel Cells at CECRI, Karaikudi from February 3-6, 1988.

The International Symposium aims at a global review of the present trends and current status of research in electrochemistry and materials science as applied to the established and emerging primary and secondary batteries as well as fuel cells. The electric vehicles would eventually become a major component of the transport system and electrochemical storage would be a serious competitor for large-scale load levelling applications. The defence forces would have to rely heavily on portable and silent power sources. The consumer electronics would need a variety of tailor made batteries. The future potentialities of batteries and fuel cells are enormous indeed.

There will be eleven technical sessions covering the various aspects of batteries such as (i) Material Science aspects of battery materials; (ii) Elec-

tro-catalysis; (iii) Electrochemical techniques in the evaluation of battery materials; (iv) Conventional and emerging battery systems; (v) Lithium batteries; (vi) Secondary batteries; (vii) Fuel Cells; (viii) Solid electrolyte batteries and photoelectrochemical cells; (ix) Traction, load levelling and solar energy storage batteries; (x) Production aspects; (xi) Testing and safety aspects.

Sixty papers on the above aspects will be presented by the delegates attending the symposium from all over the world. More than 150 delegates are expected to participate in the deliberations. There will be a Panel Discussion towards the close of the Symposium.

GOVT. DRAGGING ITS FEET ON DPCO CHANGES

The price revision exercise of controlled drug formulations under the Drug Price Control Order, 1987 is a non-starter. The government has not so far notified the amendment on trade margins as per the agreement reached

CHEMICAL INDUSTRIES ASSOCIATION

By a general body meeting of The Tamil Nadu Chemical Manufacturers' Assn., held on Dec. 31, 1987, the name of the Assn., has been changed to "CHEMICAL INDUSTRIES ASSOCIATION". This change has been done with a view to enable the Assn., operate on a national level.

The address of the Assn. remains as before: 123, Angappa Naick Street, Madras-600 001.

between drug industry and trade last December.

According to informed sources in Bombay, the government had agreed to amend the Para 21 of DPCO, 1987, immediately after the agreement was signed. Since the government has not yet gazetted the amendment, the industry is unable to issue the new formulation prices.

Under the agreement reached between the drug industry and trade, it was proposed to fix the retailers' trade margin at 15.5 per cent for controlled formulations. The wholesalers' margin was left to be decided between the industry and wholesalers.

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TANNERS' GET-TOGETHER

Modernisation of leather industry

The Central Leather Research Institute (CLRI), organized the 23rd Tanners-Get-Together at its campus at Madras from Jan. 28 to Jan. 30. Technical sessions, practical demonstrations, the Nayudamma Science Foundation Lecture, the B. M. Das Memorial Lecture, Poster Session, Panel Discussion on 21st Century Challenges to Leather Industry were the highlights of the TGT. Shri R. Prabhu, Union Minister of State for Fertilizers, inaugurated the TGT.

Welcoming the guests, Shri R. B. Mitra, the New Director of the CLRI had this to tell:

"The Tanners' Get Together in this campus in the last two decades has been serving as a meeting ground for technologists, leading industrialists and policy makers to initiate and renew contacts and exchange useful notes. I am indeed happy that this TGT opens with a note of optimism and cheer in the Leather Industry two years in succession particularly in the export front.

The distinguished participants are aware that this Institute has been following a total approach in its research endeavours covering all facets of the leather industry. In tune with this policy, the theme of the current year's Tanners Get Together has been chosen as 'Modernisation of Leather Industry'. I expect a fruitful deliberation in this twenty third meet towards this theme by the effective participation of honourable member of the industry and trade.

Ladies and Gentlemen, I consider it a happy augury and privilege to assume charge of the office of the Director of this institute today. This Institute had the privilege and tradition of being presided over by eminent scientists of international repute including Prof. B. M. Das and Dr. Nayudamma. My predecessor Dr. Thyagarajan brought in a fresh breeze and strengthened the infrastructural facilities for research. I would like to continue the good traditions laid by my predecessors and endeavour to take the Institute to greater heights.

I take this opportunity to spell out the major goals of the Institute —

- (i) Imparting excellence in the quality of classical leathers;
- (ii) Improving the performance characteristics of leathers in relation to mechanised physical requisites of end products;
- (iii) Making Indian leather and leather products competitive in the overseas markets and getting medium and higher segments of the target markets;
- (iv) Introducing process standards to eliminate empirical element to the extent possible in the manufacture of leather;
- (v) Introducing chemicals, auxiliaries and polymer base products to improve the tanning and finishing of leathers;
- (vi) Rationalising and modernising the training facilities in the country;
- (vii) Assistance in the pollution control measures and also developing pollution free or minimum process.

Technology and its Transfer:

- (i) The utilisation pattern of leather in the global level has changed in the past three decades with about 10% for leather garments, 30% for handbags, leather goods and other leather manufactures, leaving 60% for footwear. In the footwear itself there are innumerable varieties calling for different characteristics viz. physical dimensions, surface characteristic and cutting value. Indian Leather Industry is export oriented and hence the leathers should reflect the exact needs of the consumers in the importing countries.
- (ii) In view of the need for diverse pattern and increased quantity of production the institute has planned to re-orient the programme in the leather section with a view to (a) develop and standardise leather making processes with different characteristics (b) a separate section devoted to sample reproduction including tanning, finishing, colour and shade matching is being set up with the concerned experts from the institute as well from the industry (c) the regional developmental centres of this institute in Calcutta, Bombay, Kanpur, Jullunder and Raj-

kot are being strengthened with additional facilities and technical manpower to pay increased attention to the rural areas and regional problems. (d) The National Informatics Centre for Leather has been functioning in this Institute to disseminate know-how through various publications and this will be strengthened.

The theme of modernisation of Leather Industry is of relevance in the present context of transitional stage from the export of finished leathers to products. The major products traded globally is Footwear wherein India's share is poor. Hence efforts have already been initiated to strengthen the footwear section. The post graduate course on footwear science and engineering initiated this year is intended to provide the much needed high tech manpower to the industry.

The Computer Aided Design facility available in this Institute is the latest in this sphere and the industries can make much better use of the same.

The other areas that require further work are (i) checking or minimised environmental pollution (ii) improved utilisation of animal byproducts (iii) designing and standardising appropriate tannery and leather product machinery.

In the international sphere it seems desirable to constitute an intra regional panel on leather research for the third world countries to exchange useful notes and arrange co-ordinated respect. It is my desire to organise a 'Tanners' Meet' as a first step covering the third world countries to review the problems and prospects as a region with special reference to Technology and Technical Manpower.

Concluding Remarks:

In our vast country, the problems of leather industry are complex with the involvement of many sections interests and products demanding varied solutions. In the process of restructuring, the institute has been called upon to give package assistance. The task is no doubt a stupendous and the Institute would strive to do it with the effective participation of my co-scientists and technologists and above all willing co-scientists and technologists and co-operation of the entrepreneurs. We are earnest in helping the industry to achieve the cherished goal of putting India prominently in the leather map of the world. In this process the interest of the small

working in a village will also give our ardent care and attention. Finally, once again I wish to express great pleasure in extending a warm welcome to the honourable guests and distinguished delegates to this memorable function."

Dr. K. V. Raghavan, acting director, CLRI gave a resume about TGT-88. The spotlight of the TGT this year was on the R&D Activities of the CLRI.

There was a presentation of awards conferred by Shri K. Parthasarathy, Shri S. Ghosh and Shri S. Sadulla were presented awards by the Union ministers.

In addition Shri Ram Fibres appreciated CLRI's guidance in development of a new product "Tuftan" presented awards to the following CLRI scientists: Dr. K. V. Raghavan, Acting Director, CLRI; Dr. K. S. Jayaraman and Dr. J. K. Khanna, Assistant Director, CLRI. This was followed by the Release of the Book, "Enzyme Technology in Beam House Practice," written by two CLRI scientists, and published by the National Information Centre for Leather and Allied Industries located at CLRI.

PLEA FOR A POSITIVE ROLE IN CHECKING POLLUTION

Shri R. Prabhu in his inaugural address noted:

"Leather industry has undergone a phenomenal growth, particularly so in the recent past, to attain a place of prominence in the Indian industrial scene. This is one of the few Indian industries with excellent potential for increased exports in the years to come. The international demand for Indian leather and leather products has thrown up enormous opportunities as well as technological challenges. As I understand from the observations made in this meeting, traditional processing technologies, pollution problems and high subjectivity in quality assessment are the major weaknesses of Indian leather industry. Modern concepts, ideas and techniques are needed to overcome the weaknesses. Viewed from this context, the theme of TGT-88 viz., modernisation of leather industry is most appropriate and timely. It is very relevant that an international organisation like Committee on Science & Technology in Developing Countries (COSTED) is associating in organising the TGT. This association should

pave way for more international cooperation in the leather field particularly so with the developing countries.

The Tanners Get Together provides an unique opportunity for the leather industry to come in close contact with the research scientists. Their attention during this get-together is particularly drawn to the problems associated with the raw material quality assessment, utilisation of byproducts, atmospheric and water pollution and technological obsolescence. As I understand from the experts in the leather trade, the current status of raw hides and skins in our country is causing concern. Even at the international level a shortage of about 10% of raw hides and skins is expected by the year 1990. It is, therefore, very important for India to place emphasis on technological options for achieving better utilisation of the scarce raw material. Simultaneously efforts have to be made to improve the quality of raw stock. I am told that significant losses occur due to the post- and ante-mortem defects, parasite infections, flay cuts, etc. on raw hides and skins. Improper storage and transportation of raw stock are

also contributing to the loss in production. Systematic efforts have to be made for better selection and preservation methods, construction of warehouses in rural and semi urban areas for storage of hides and skins and quicker transportation methods. Modernisation of slaughter house facilities and application of scientific meat packing techniques would also help to improve the situation. As I mentioned earlier, the quality assessment of raw stock and leather is being done through subjective methods based on personal judgement. Scientific methods have to be devised to make the assessment techniques more objective.

I am also very concerned with agricultural lands and drinking water wells being polluted with industrial effluents. The leather industry has to play a positive role in providing cleaner environment to the people living in the vicinity of the tanneries and leather units. This is one of the major challenges the industry has to take up during the next couple of years.

I am impressed with the growth of leather products industry, particularly (Contd. on p. 50)

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Plan Panel steps up allocation to ONGC

The Planning Commission has allocated Rs. 2350 crores to the Oil and Natural Gas Commission (ONGC) for 1988-89 compared to Rs. 2056 crores in 1987-88 to help it step up production of oil and oil equivalent of gas (OEG) by 3.25 million tonnes during the next financial year.

According to official sources at New Delhi, in its bid to accelerate the crude oil and gas output from the established reserves within the country, ONGC plans to achieve a crude and gas output target of 36.45 million tonnes (29.28 million tonnes of oil and 7.17 million tonnes of oil equivalent of gas) in 1988-89 as compared to 33.20 million tonnes (27.62 oil and 5.58 oil equivalent of gas) planned to be achieved during the current year.

The next financial year will be important for ONGC in view of the fact that besides, Bombay Offshore, Tripura and Krishna-Godavari have emerged as major gas bearing regions in the country. As a result, the natural gas availability is going to increase by

1586 million cubic metres in 1988-89 as compared to 1987-88.

The foreign exchange savings to be effected during 1988-89 as a result of natural gas utilisation is estimated to be of the order of Rs. 1543 crores, as against Rs. 1183 crores in 1987-88. Most of this saving in foreign exchange is due to gas utilisation in the fertiliser and power sector, industrial fuel and LPG production.

In the southern region, gas is likely to be supplied to five industries from the Krishna-Godavari basin. By the end of the Seventh Plan (1989-90), the gas supply is expected to reach three million cubic metres per day from this basin.

With the Hazira LPG plant going on stream, the combined production from the plants at Uran, Ankleshwar and Hazira is expected to reach a level of 656,000 tonnes of LPG in 1988-89.

Some of the future thrust areas of ONGC are: exploration in deeper water, drilling of high temperature/high pressure wells, optimisation of offshore

structure designs to reduce cost, and sea completion to exploit the remote hydrocarbon finds are the future challenges which merit concerted efforts.

A deep-water and continental shelf exploration programme is being launched in various phases during 1989-90 commencing with acquisition of seismic lines data processing and its interpretation and drilling identified locations followed by production.

ONGC has re-entered the logistically and geologically complex areas in the States of Himachal Pradesh and Jammu and Kashmir. The deepest well in Asia is being drilled by ONGC at Surinsar near Jammu. The well targeted to be drilled down to a depth of 7,000 metres is expected to be completed by March, 1990.

Two other charter-hired deep drilling rigs presently deployed at Jawalamukhi and Nurpur in Himachal Pradesh are targeted to drill up to 6,000-6,500 metres. An additional super-deep rig on charter-hire is planned for induction during 1989-90 to drill up to 7,000 metres at Samwal in Jammu and Kashmir.

Finding of more oil in the existing oil fields with new emerging technologies and increasing the recovery of hydrocarbons through enhanced oil recovery techniques will receive a bigger thrust. Three out of the nine pilot projects have already been commissioned at Senand and Jhalora in Gujarat.

In offshore, giant single piece jackets at large water depths are proposed to be installed. Sub-sea completion, which holds promise for production from deepwater wells has been successfully completed in the western offshore. The introduction of this technology as an R and D project has also been cleared by the Union Government and will be implemented in the Krishna-Godavari basin at a cost of Rs. 20.94 crores.

Several innovations like drilling the rig, clustered drilling and modifications of the mast, etc. which have already helped in saving the costs of drilling operations in the eastern region will be extended to other regions as well.

Some of the major new discoveries made over the last few years include Gandhar and Dehej in Gujarat, Nariman, Kovilkalappal and Bhuvanagiri in Cauvery basin, Changmaigaon in Assam, CA, CD, C-22, C-24, D-18, D-1

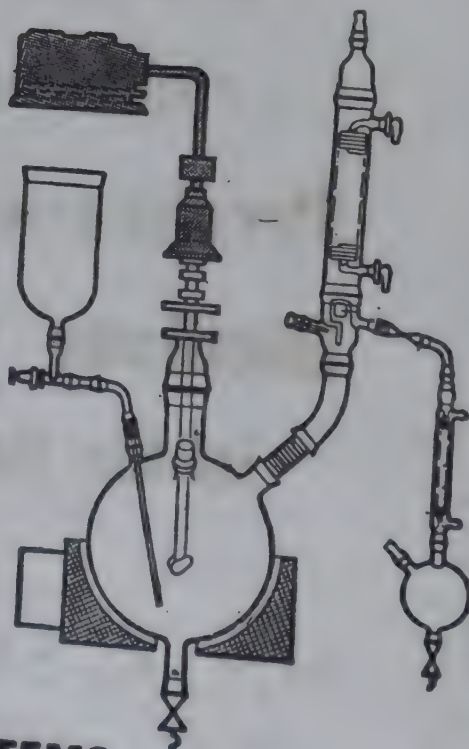
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d D-II and B-series in western offshore, and CG-16-2 and 8 in Krishna-Bodavari offshore.

Most of the onland structures have already been out on early production system (EPS), which besides expediting the process of reservoir assessment would help in contributing to an increase in production.

So far, 23 new oil and gas finds have been put on production through EPS (22 onland and one offshore). Production from the offshore structures is also being planned through floating production systems.

Another encouraging feature, which is of crucial importance is the fact that the reserves to production ratio has gone up, implying there are more reserves today to sustain the accelerated rate of production than there were six years ago.

As on January 1, 1981 the hydrocarbon reserves were estimated to be 3305.37 million tonnes which have presently increased to 4062.61 million tonnes as on January 1, 1987.

MANY FIRSTS FOR ONGC AT SURINSAR

Drilling by the Oil and Natural Gas Commission (ONGC) at Surinsar, where exploration for hydrocarbons was resumed on May 18 last year, has reached a depth of 2,240 metres.

Drilling to the targeted depth of 7,000 metres is to be achieved within three years.

Official sources at Jammu said that two records had been created at Surinsar during the last eight months. The first 24-1/2 inch casing, biggest and the first of its kind, was successfully lowered to a depth of 800 metres. The second casing of 18 1/2 inches, lowered to the depth of 2,007 metres, was the deepest in south east Asia.

ONGC has gone 'superdeep' for the first time at Surinsar. Four independent exploratory locations have been released for 'superdeep' drilling in the area. This was done on the basis of a survey by a French company in 1981-82.

"We have faced no problems so far," an official spokesman said. This is remarkable in view of the series of overpressured water-bearing sands encountered after a depth of only 1,200 metres when exploratory drilling was

taken up in Surinsar for the first time in 1970.

At that time, drilling had to be "terminated prematurely" at a depth of 3,665 metres due to technical complications. The targeted drilling depth at that time was only 600 metres. (More oil news appears elsewhere in this issue)

PLEA TO CUT CUSTOMS DUTY ON PVC RESINS

The PVC pipes manufacturing industry is facing a crisis due to the steep increase in duty on the landed cost of imported resin, according to the PVC Pipe Development Organisation.

The Organisation President, Mr. P. P. Chabaria told newsmen at New Delhi on Jan. 21, that about 40 units in the small scale sector of the industry were almost on the verge of closure and another 100 units working at 30 per cent capacity utilisation.

He said the landed cost of PVC resin now worked out to about Rs. 28,000 per tonne to the indigenous PVC resin price of about Rs. 23,000 per tonne.

At present the country imports about 80,000 tonnes of PVC resin to supplement the indigenous production and so of the same quantity.

RANBAXY AWARDS ANNOUNCED

Two scientists each have been selected for the Ranbaxy research awards, 1986, for medical and pharmaceutical sciences.

The Ranbaxy award for medical sciences for 1986 has been shared by Prof. C. L. Pathak, Emeritus medical scientist and principal investigator, DST project, Medical College of Jodhpur and Dr. (Miss) A. K. Susheela, Associate Professor of histocytochemistry, Department of Anatomy of All India Institute of Medical Sciences.

The Ranbaxy research foundation award for pharmaceutical sciences has been shared by Dr. R. C. Srivastava, Professor of Chemistry, Birla Institute of Technology and Sciences, Pilani, and Dr. K. B. Mathur, Head of the Polymers Division at the Central Drug Research Institute, Lucknow, according to a foundation release.

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(Contd. from p. 47)

in the footwear and garment sector. These units provide employment to the weaker sections of our society and to women. There is need for suitable vocational and training programmes to upgrade their skills further. There is perhaps a severe shortage of trained manpower in the footwear sector. Against this background, the recent efforts by CLRI in starting Post-graduate diploma and degree courses in footwear science and engineering is noteworthy. The footwear units can look forward to employing these engineers for their managerial positions.

Modernisation in leather industry requires additional financial and infrastructural resources. Schemes involving common facilities centres with modern machinery should be encouraged since they benefit a larger group of leather units. Many of the small and medium scale units may not have

resources or expertise in modern management and marketing methods. Such units require management and entrepreneurial guidance from appropriate agencies and state level corporations. These problems can be discussed by the experts during the panel discussion session.

Call to Boost Leather Exports

Though the exports in the leather product sector have increased significantly during the last few years, there is a strong need to bring qualitative changes in the product range being exported. Most of our leather units are exporting components rather than fully fabricated products. This is particularly so in the footwear industry. Indigenous design and fabrication capabilities have to be upgraded to change this trend. Our industry should have the knowledge of latest fashion trends prevalent in the developed countries. Fashion information can be dissemina-

STATUE UNVEILED

Shri M. M. Hashim, Chairman Council for Leather Exports, unveiled the statue of Shri A. Nagappa Chettiar, the doyen of the leather industry on the evening of Jan. 27 at the CLRI campus. Shri Hashim described him a true pioneer who opened the gates of Indian leather to the international scene. He travelled the world over with Indian leather, and had the foresight to trade with finished leather goods even in those early days. Also he made handsome contributions to the setting up of the Leather Science Centre, though he did not live to see it completed. Shri Hashim later opened a mini exhibition on "Leather for Culture" at the centre.

ted through information centres with suitable data base. Computer facilities can be employed for quick information retrieval. Such centres can be set on cooperative basis.

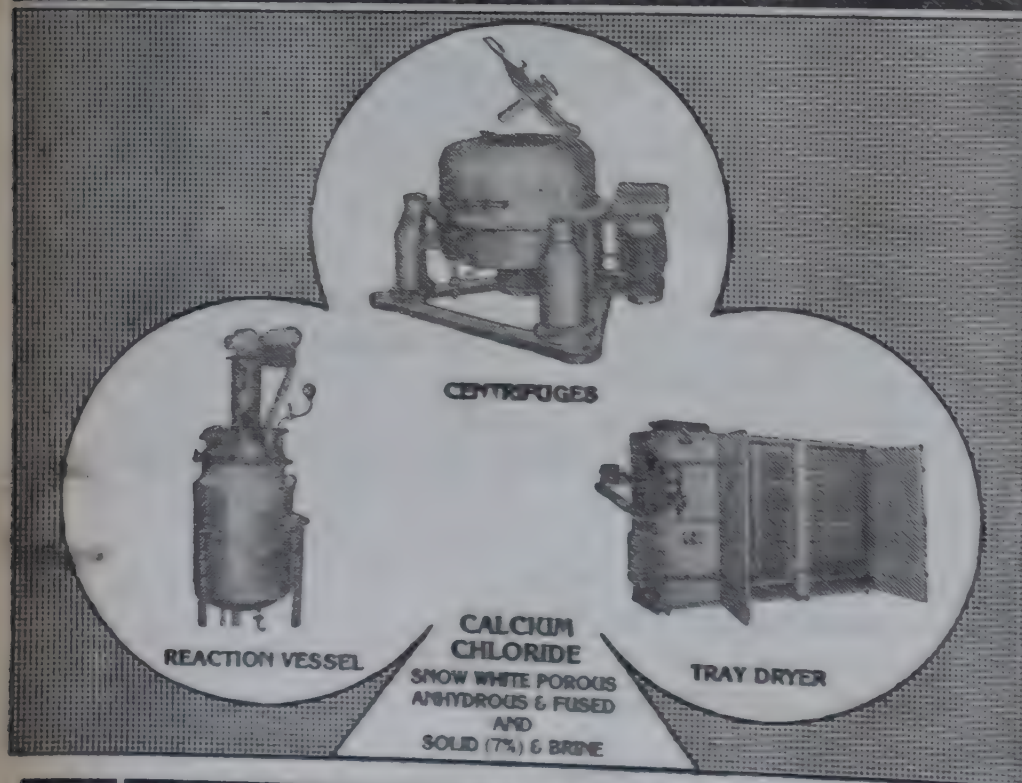
There are many leather units in the country with excellent infrastructure facilities, expertise and management. They can take a lead role in going for joint ventures with developed countries in setting up new units in developing countries. More sales offices and trade centres are required in overseas countries to export Indian leather products with Indian brand names.

The 23rd Tanners Get Together addresses itself to many of the vital issues contributing to the modernisation of Indian leather industry. The technical sessions are well balanced with lectures and practical demonstrations. I am happy to know that the Panel Discussion is being organised to examine the 21st Century Challenges to the Leather Industry. I have great pleasure in inaugurating the Tanners-Get Together".

Shri A. L. Mudaliar, Chairman Board of Governors, Indian Institute of Technology, Madras presided over the inauguration. He cautioned that availability of good hides and skins will be the limiting factor in the Indian and international markets.

A vote of thanks followed.

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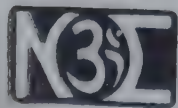
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48 CIL projects with foreign tie-up

Coal India Ltd. (CIL) has identified 48 projects for development on a turn-key basis with foreign collaboration at an estimated cost of Rs. 4,257 crores, including a foreign exchange component of over Rs. 1300 crores.

According to official sources at N. Delhi the ultimate annual capacity of these projects, which are expected to be completed by the end of the Ninth Plan, has been put at over 121 million tonnes. While the proposals for 20 projects have been firm, the rest are still under formulation.

The countries with which CIL has entered into tie-ups are the USSR, West Germany, Poland, France, East Germany, Australia, Canada and the UK.

Foreign Assistance through IBRD has been made available in respect of the Dudhichua coal project of NCL and Jharia coking coal project comprising Block-II OCP, Pootkee-Balihari underground project with Pootkee washery of BCCL, Gevra expansion OCP (WCL) and Sonapur Bazari opencast project (ECL).

A total loan of around \$ 580 million is available against these projects.

The USSR is expected to develop 15 of the 48 projects. The names of the projects are, Jhanjra (underground), Khadia (opencast), Mukunda (opencast), with washeries, Nigahi (opencast), Kumari (opencast), Moher (opencast), Sitanala (underground), Mahal (underground), Kapuria (underground), Parbatpur (underground) integrated, Kharkharee Pharmadand (underground), Barmondia (underground), Dakhinkhand (underground), Sirpur (taitore seam) and Parkasham Khani I and II (underground).

French collaboration has been mainly sought for extraction of steep, deep and thick seam without stowing by application of sublevel caving and multilift longwall mining. Blasting gallery method is being applied for extraction of locked up pillars in thick seams already

developed on board and pillar system.

All these methods would have wide application after their initial success.

Turn-key contracts have already been signed for blasting gallery method at East Katras and Chora, sub-level caving technology at East Katras are under implementation. The turn-key contracts for multilift longwall mining at Kottadih and sub-level caving at Parasea have been negotiated but are yet to be finalised. French credit have been provided for these contracts.

Modernisation of Bhanora west mine (ECL) has been indentified for improving production and productivity by introducing long-wall mining with the help of West Germany. Powered support long-wall mining in Dishargarh seam at Chinaguri with difficult geominig conditions, has also been indentified for co-operation.

Contract for feasibility studies for Bhanora and Chinakuri have been signed under KFW financial co-operation. Suitable technology for working Tandsi and Sethia blocks (WCL) with adverse geological conditions is expected to be worked with FRG assistance. German equipment is under installation at Gopalichak (BCCL) for introduction of hydraulic mining.

The equipment and technical assistance for the hydraulic mining are covered under FRG grant.

Polish assistance has been sought for sinking deep shafts of large diameter at Satgram (ECL) and Pootkee-Balihari (BCCL). Shaft sinking at Satgram has been completed and horizontal development work is in progress.

Project report with washery for Madhuban Phoolarit and the underground mine of BCCL is also under preparation with Polish assistance.

Hydraulic mining at Bargolal (NEC) and Rajmahal expansion OCP (ECL) have been identified for development with Canadian assistance. Project document for Rajmahal OCP has been prepared. Some financial assistance is likely to be provided by Canada.

Piparwar OCP (CCL) has been indentified for development with Aus-

tralian co-operation. The project document has been received and under examination.

Reclamation of worked-out opencast mine at Bistrampur (SECL) and Niljai OCP (WCL) for introduction of bucket wheel excavators have been indentified for GDR co-operation. Contracts for preparation project report have been signed.

Ghusick (ECL) underground project, with a capacity of two million tonnes annually has been identified for collaboration with on turnkey concept. Preparation of project report has been completed.

Negotiation for the electrification package for JK Nagar mine (ECL) and EMP for Amlori (NEC) are in progress. Credit and grant facilities are available for UK-assisted projects.

COAL SECTOR INDIA, FRANCE AGREE ON NEW PROJECTS

India and France agreed to strengthen their co-operation in the coal sector, with the former proposing new project in Wardha coalfields, to be taken up with French assistance. The French side agreed to examine the same, according to an official release.

Strengthening of co-operations was agreed to at the two-day meeting of the Indo-French working group on coal which identified new areas. At the group reviewed the progress of coal projects being undertaken with French assistance.

A protocol was signed by coal secretary S. Varadan and French secretary in the ministry of industry and tourism Peirre Francois Couty.

Among the coal projects being undertaken with French assistance are Chora, Kottadih, Parasea in Raniganj coalfields, Ananta and Nandira Talcher coalfields and GDK-10 Singareni Collieries Company.

Referring to the formidable task of achieving coal production of over 400 million tonnes in the country by the year 2000, Mr. Varadan underlined the significance attached by India to the induction of new technologies, efficient project implementation and increase in productivity so as to ensure cost effective capital investment.

coal output likely to fall short of target

The coal production in the terminal year of the Seventh Plan is expected to fall short of target by 14 million tonnes, mainly because of overruns of some projects.

The target of coal production by 1989-90 was projected by the Planning Commission at 226 million tonnes. The production level in 1989-90 is now estimated at 212 million tonnes by the commission.

The gap will have to be met through imports of coking coal and draw-down of pit-head stocks, according to the mid-term review of the Plan.

The Plan targeted for a raw coal demand of 237 million tonnes by the terminal year. However, the mid-term assessment now is that consumption in 1989-90 will be only about 220 million tonnes because of slower growth in coal-based thermal power stations and reduction in steel sector mainly because of higher import of prime coking coal.

The review says that a number of projects in the coal sector have slipped. A serious problem in this regard is the delay associated with land acquisition, resettlement of the ousters and environmental clearances. For future projects it will be necessary to acquire land well in advance and start environmental management works from an early stage itself.

By the end of the Seventh Plan, all the production was expected to go through coal handling plants for segregation of extraneous matter from coal and for the crushing of coal before dispatch. A level of 67 per cent has already been achieved in the first two years of the Plan.

However, the average calorific value of non-coking coal is declining and the long-standing issue of beneficiation of non-coking coal has to be settled before the end of the Plan.

The problem of coal movement is no longer severe as in the past, but there is still a mismatch of movement capacity between production and consumption centres.

The commission has stressed the need for modernisation of coal exploration techniques to reduce the time and cost of exploration and improve the geological confidence in the proved reserves category.

Lignite production in Neyveli in 1989-90 is now expected to be only

11 million tonnes, as compared to the target of 13.7 million tonnes. This is because of the delay in the commissioning of the downstream power units.

Efforts are required to start work on the first mine expansion and the third mine along with associated power units in the Seventh Plan itself so that new projects for benefits in the Eighth Plan can be identified and formulated soon.

POLYOLEFINS RESEARCH CENTRE INAUGURATED

The Energy Advisory Board Adviser and former Union Petroleum Secretary Mr. Lavraj Kumar, inaugurated on Jan. 25 a modern pilot scale polyolefins research facility at the public section, Indian Petrochemicals Corporation Ltd., (IPCL) complex at Baroda.

IPCL has set up the facility, described as the first of its kind in India, at a cost of Rs. 4.5 crores.

The facility will be used to carry out advanced research for the development of thermoplastics and elastomers using novel catalyst systems and state-of-the art control systems, an IPCL spokesman said.

The project was a collaborative effort of IPCL and Engineers India Ltd., to develop indigenous data base for the design and setting up of large-scale polymer plants in India in the future using locally developed catalysts, he said.

According to the spokesman, the pilot plant incorporates futuristic computer and microprocessor based control systems along with advanced equipment conceptualised, designed and engineered by IPCL and oil scientists.

Plant safety and reliability of data for research and development purpose formed the basic design philosophy of the facility, he said.

The facility will also be used for process improvements, energy saving and improvements in the existing polymer plants at IPCL.

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OIL misses targets

Oil India Ltd. (OIL) has slipped on almost all the targets fixed for it for the current financial year, according to a recent Planning Commission study.

Apart from the failure to hit the crude production target, OIL's performance has fallen short of expectations in several vital areas such as seismic survey, exploratory drilling, development drilling, and gas despatches.

OIL has also failed to utilise fully its Plan outlay. The anticipated expenditure for 1987-88 is Rs. 195 crores against an outlay of Rs. 210.10 crores.

Against the target of producing 2.87 million tonnes of crude, OIL is likely to end the year with an output of 2.55 million tonnes i.e. 89 per cent of the expected level.

The slippage in crude oil output has been attributed to disruption in production due to the "abnormal situation" in Assam, shortfall in work-over operations and development drilling, inadequate gas lifting due to shortage of high pressure gas, and floods. The proposed targets for 1988-89 is 2.90 million tonnes,

of which 0.086 million tonnes is envisaged from Arunachal Pradesh.

Gas despatches are anticipated to touch 850 million cubic metres against the target of 977 million cubic metres for 1987-88. The lower sale has been attributed to unscheduled stoppage of delivery due to bandhs, picketing and inability of consumers to lift full quota of gas. The target for 1988-89 is 900 million cubic metres.

The Planning Commission study reveals that the output of OIL's departmental seismic parties has come down from 2528 SLK in 1986-87 to 2200 SLK in 1987-88 despite the fact that the 5th seismic party was commissioned in 1987-88. This may be partly due to operation in more difficult terrain. Also in 1988-89 total seismic activity of OIL will be 2200 SLK against 2460 SLK in 1987-88 and 4923 SLK in 1986-87 due to lack of any planned activity by the contractual party.

In the field of exploratory drilling, during 1987-88 the anticipated achievement has been put at 61,450 metres against the target of 71,000 metres. The drilling programme in

Mahanadi onland has been curtailed from seven exploratory wells four based on geological information obtained from the drilling of the exploratory wells. The shortfall in Rajasthan is due to the delay in bringing the rigs.

During 1988-89, a total of 54 metres of exploratory drilling planned comprising 38,000 metres in Assam and Arunachal Pradesh, 12,000 metres in Rajasthan and 4 metres in NEC offshore.

Against the development drilling target of 99,000 metres in 1987-88, the anticipated achievement is 84,000 metres in Assam and Arunachal Pradesh. The main reasons for the shortfall include delay in arrival of rigs, down-hole problems, shortage of drilling crew and prolonged production testing in some wells. For 1988-89, the target for development drilling is 112,000 metres.

PESTICIDES UNITS SEEK SOPs FOR EXPORTS

The lack of domestic demand for pesticides has put the industry at a spot with capacity utilisation stagnating at 52 per cent in last few years, according to Mr. Salil Singh, chairman of Pesticides Association of India (PAI).

The only hope lies in boosting exports which could touch Rs. 300 crores annually with appropriate support from government, Mr. Singh told newsmen at New Delhi on Jan. 20. Pesticides exports are valued at Rs. 30 crores.

The PAI has urged the government to declare pesticides industry as a major thrust area for exports and restore the 10 per cent cash compensatory support.

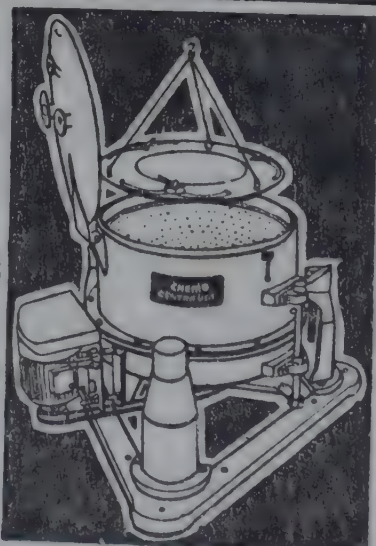
Mr. Singh said in order to make exports more competitive there is a need for early finalisation of a proposal to provide raw materials and solvents at international prices.

He called for subsidy for obtaining registration for exports as export registration fees have to be supplemented with data which is generated at heavy cost.

PAI has urged the government to shorten the procedure for fixation of brand rates, tax-free export knowhow, reduction of interest on export finance to achieve parity with Libor, restoration of drawback on packing material and withdrawal of the 15 per cent tax on foreign exchange drawn for trade abroad.

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Russia to step up imports of Indian dyestuffs, cosmetics

The USSR is expected to step up imports of chemicals, dyestuffs, pharmaceuticals, cosmetics and the like from India in this calendar year. As per the trade agreement, signed in 1988, Russia would be buying about Rs. 400 crores worth of these products from India.

The Russian imports of these items from India have been lower and fluctuating during the past few years because of the trade imbalance between the two countries. In 1987, the Russian import of these items accounted for only about Rs. 200 crores.

The expected doubling of Russian buying from India is attributed to its increased requirement of agrochemicals, cosmetics, dyestuffs, toothpaste and essential oils.

Export circles at Bombay say that Russia would be buying Rs. 30 crores worth of dyestuffs and intermediates in 1988, as against its purchase of about Rs. 10 crores worth of dyestuffs in 1987.

The USSR has committed to buy Rs. 40 crores worth of cosmetics and toiletries in 1988. The pre-purchase of these items in 1987, was only Rs. 24 crores.

Russia has also signed a contract with a leading Indian company for purchase of Rs. 15 crores worth of toothpaste. There was no export of toothpaste from India to USSR in 1987.

The export of agrochemicals to USSR is expected to be about Rs. 41 crores in 1988, whereas it was only about Rs. 24 crores in 1987. The government of India is making special efforts to promote the export of agrochemicals to the USSR.

Another item, Russians would be importing more from India this year is pharmaceuticals and fine chemicals. The planned import of these items in 1988, would be to the tune of Rs. 93 crores, whereas it was only about Rs. 60 crores in the previous year.

There is, however, a total stoppage of import of synthetic detergents from India by the USSR. Import of these items used to be about Rs. 25 crores per annum by the USSR.

The export circles are, meanwhile, hopeful of achieving the target of Rs. 750 crores fixed by the Basic

Chemicals, Pharmaceuticals and Cosmetics Export Promotion Council for 1987-88. Actual export of both bulk drugs and dyestuffs are expected to exceed the targets during 1987-88.

The Council had fixed an export target of Rs. 150 crores for bulk drugs and a target of Rs. 120 crores for dyestuffs in 1987-88.

DETERGENTS USE RISING

The consumption of detergents which had increased to 7,20,000 per annum from a meagre 93,000 tonnes in 1975 was expected to capture about 50 per cent of the total washing product market by the end of the decade.

According to a recent study conducted by the Indian Petrochemicals Corporation (IPCL), in view of this rising demand of synthetic detergents, the demand for linear alkyl benzene (LAB), the basic raw material for the manufacture of detergents, was expected to go up to

1,45,000 tonnes per annum by 1990.

For increasing LAB production, IPCL had already added one more unit to its plant in Baroda. With the addition of this unit, IPCL would be able to process 3,20,000 tonnes of kerosene per year which would increase LAB production to 43,500 tonnes per year by 1988.

The existing plant is tuned to process 1,48,000 tonnes of kerosene to produce 30,000 tonnes of LAB.

Two more companies, Reliance and Tamil Nadu Petrochemicals, have also gone in for the production of LAB with capacities of 50,000 tonnes per annum each.

BIO-ENERGY CENTRE

A bio-energy centre would be set up at the Tamil Nadu Agricultural University in Coimbatore at a cost of Rs. 12.76 lakhs, Mr. A.D. Jeyampandyan, Member, Board of Management of the University said in Madurai.

He said that the centre would help in the enhanced growth rate of improved wood yield, effective cropping and efficient energy recovery.

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EIGHTH ENERGY PLAN COST Rs 1,25,000 CRORES

plan panel sceptical of mobilising funds

The Planning Commission is sceptical of finding resources for funding the Eighth Five Year Energy Plan which is estimated to cost Rs. 1,25,000 crores writes Sneh Lata Bhatia in the *Economic Times*.

The projected investment includes financing of coal, power, oil, natural gas and renewable energy sources. However, it does not include investment in the related sectors like transport. The commission working out an integrated energy model proposes to include investment in the related sectors as well to ensure that isolated investments project-wise are not made.

The integrated energy model is likely to be ready during the current year. Its implementation should start with the Eighth Plan itself, if the model is approved by the National Development Council.

The model is based on the concept of "marginal cost" of generating an additional unit of energy from the coal, oil, gas, atomic energy and alternative sources. To arrive at the model, the commission has set up a committee to work out a commercially viable pricing formula for the sale of the unit of energy of the various energy sources and product-mix. It will be pricing which will determine the marginal cost. Consequently, arriving at the optimal energy source-mix, the commission will set out priorities for approving projects. Currently the departments concerned do some preliminary exercise related to the availability of the other inputs.

The commission feels this is not enough. For instance while approving a thermal power project, issues such as coal linkages, transportation etc. are not taken into account. Every department looks at the project from its viewpoint. The commission proposes to introduce the complete change from the existing system. After arriving at the best combinations, decision on the project approval will depend on the availability of other inputs and the required infrastructure.

What is worrying the commission is that the energy sector is highly capital intensive and spread over a period not less than four to five years. The long gestation raises the

cost of the project even if the time overruns are kept under strict control. In such a situation financing becomes difficult.

In a detailed paper on financing of the Eighth Five Year Energy Plan, the commission has worked out that it would cost not less than Rs. 1,20,000 crores at current prices. It has identified the possible sources of financing thus (1) internal resource generation of the enterprise (2) budgetary support, (3) term-loan from financial institutions (4) market borrowing—bonds, debentures, share issues, (5) commercial borrowing abroad, (6) World Bank loans (7) bilateral offers — tied credit (8) private capital participation jointly with the public sector and finally private capital participation independently.

The Commission points out that commercial energy sectors — oil, coal power — are wholly in the government sector.

About 78 per cent of the power capacity is in the state sector as distinct from the Central sector. The commission points out that the generation of internal resources by the SEBs (state electricity boards) have a very little margin. Besides the distribution and transmission losses their financial structure precludes them from being financially healthy. One of the major reasons according to the commission is that SEBs have no equity capital. Even if the interest rate is low their entire capital is a loan. Barring a few no SEB has a debt servicing capacity.

As to the budgetary support, the commission notes "governments at the Centre and states have a negative balance of current revenue. After devolution the Central resources are almost wholly consumed by defence subsidy and another non-plan expenditure.

The commission, however, pins hopes on external borrowing "subject to the overall balance of payments situation". Similarly market borrowing, too could be a source of financing and the Commission is looking at it seriously.

The World Bank loan, though should not be a problem but have the limitation that these require matching rupee resources.

As to the bilateral aid, this is the disadvantage of tied credit which cuts into the order books of indigenous suppliers. Moreover it meets the cost of the projects only partially with the problem of finding the matching rupee resources remaining as it is. It points out the large-scale participation of private capital in the energy sector is ruled out.

The prospects of the oil sector are bright because of the internal source generation, access to external assistance and borrowings. In the coal sector the problem is grave because of the deteriorating quality of coal rising underground mining production costs.

The commission is not in favour of a large investment in the conventional energy sources as they are very expensive and require high subsidy. Experts point out that the investment estimates have been made by the projections of individual ministries and departments. They could be higher as per the "integrated energy model" needing matched investment in the required infrastructure for the best and the timely product-mix.

FERTILISER PLANT

INDIAN SURVEY TEAM TO VISIT QATAR

India will shortly send a team of experts to carry out a feasibility survey for establishing a modern gas-based fertiliser plant in Qatar with buy-back arrangements for ammonia or urea produced by it also for an aluminium plant based on raw materials from India.

The delegation will visit this oil and gas rich Gulf state in accordance with a decision taken at the end of the three-day Indo-Qatar joint committee in Doha recently.

Qatar which has the world's largest reserve of non-associated gas is interested in seeking a firm commitment for fertilisers produced by it in return for iron ore from India. A delegation of the Qatar steel company will shortly visit the Kudremukh Iron Ore Company in Maharashtra to finalise the trial order — expected to be of 15,000 tonnes.

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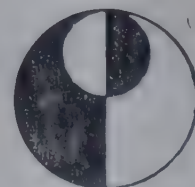
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small sector investment limit being raised

The investment limit for small-scale units is being raised. A decision to this effect has been taken in principle by the Union Industry Ministry. However, a consensus on the quantum of increase is not yet reached.

Official sources say that the decision on this rests less with the bureaucracy and more with the political leadership. This is because any increase in the investment limit not only leads to a redefinition of the small units but is also seen as an indicator of the Government's policy towards the small sector vis-a-vis the large industry sector.

According to these sources, the revised investment limit is expected to be announced along with the Union Budget for 1988-89. The last revision in the investment limit from Rs. 20 lakhs and Rs. 25 lakhs to Rs. 35 lakhs and Rs. 45 lakhs for small units and ancillaries, respectively, was also announced along with the presentation of the Union Budget for 1985-86.

The proposals supported by the Industry Ministry, have sought a rise in the investment limit for small-scale units from the present Rs. 35 lakhs to Rs. 50 lakhs. Ancillaries investment limits have also been sought to be raised by a similar margin.

However, the Ministry has wanted that the increase in investment limit should not be allowed for those units which are engaged purely in

assembly work. It is argued that there is no need for raising the limit for assembly units, since there is not much cost escalation in this sector meriting an increase in the investment limit.

On the other hand, the need for raising the investment limit is recognised by the Ministry in view of the escalation of costs of plants and machinery since these limits were last revised in March 1985. The Ministry, therefore, has argued that the increase in the investment limit should at least ensure that the revised definition takes into account the increased cost of plant and machinery.

The Industry Ministry has been receiving several representations from many quarters about raising the investment limit for small units. One such representation sought an increase in the limit to Rs. 75 lakhs for the small units and to Rs. 1 crore for the ancillaries.

This proposal, however, did not find favour with many in the Ministry. The small industry associations also opposed this proposed big increase in the investment limit. They felt that acceptance of this proposal would facilitate the entry of relatively bigger units than the average small units into the small-scale sector, thereby cornering the various benefits that are actually meant for the small units.

Another proposal that came for consideration was to bring down

the investment limit to a level about Rs. 5-10 lakhs. The object of this move was to restrict the benefits of small units only to tiny units which need these facilities the most. It was argued that units which have investment in range of Rs. 35 lakhs were strong enough to face competition without the support, facilities and protection given by the Government to the small sector. As such, the facilities should be given only to units with lower investment in the range of Rs. 5-10 lakhs.

The Industry Ministry did not approve of even this proposal as it felt that the move would reduce the scope of the schemes meant to promote the small-scale sector. Also this would have ignored the fact that cost escalation and inflation had jacked up the investment costs.

Official sources say that a final decision on the quantum by which the investment limit would be increased would be taken by the Government soon. But these sources are not sure whether the increase would take the limit to Rs. 50 lakhs or to Rs. 75 lakhs. The matter is still to be decided by the Union Cabinet.

The definition of small-scale unit is governed by the investment made in fixed assets like plant and machinery. If this investment does not exceed Rs. 35 lakhs, the unit is eligible for registration as a small unit and if the investment does not exceed Rs. 45 lakhs, the unit is eligible for registration as an ancillary with supplies to a large unit.

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CSIR makes positive contributions

The Council of Scientific and Industrial Research comprising 41 laboratories has slowly begun emerging from its past passive role in the country's development by making several positive contributions that could boost the economy in the long run.

In 1987, the council had several achievements to its credit, the most noticeable among them being the increasing self-reliance it has attained in regard to funding.

In the financial year, 1987-88, the council will earn as much as Rs. 40 crores from royalties of technology transferred, consultancy services for the industry and fees from joint research projects with industry and others.

In 1986-87, the earning came to only Rs. 30 crores. According to official sources, the council has a budget of Rs. 175 crores out of which only Rs. 148 crores is allocated to CSIR's own research, the balance being grants to various universities and to other scientific bodies.

Judged from this, a spokesman claimed that CSIR is becoming more

and more financially self-dependent. The earnings from outside is now about 30 per cent of the total budget, the target fixed by the Abid Hussain Committee.

The Committee wanted CSIR to be more industry-oriented, slash projects which were irrelevant to the national economy.

The spokesman claimed that the CSIR laboratories could earn much more if it undertook activities like routine testing for the industry. But it had to undertake major strategic projects that could eventually improve the living conditions of the people.

For instance, it has a major role in the national technology mission for providing drinking water to villages, a major role again in the wasteland development programme and small roles in oilseeds, literacy and vaccination missions.

CSIR is also contributing to the development of drugs whose formulae are closely-guarded secrets of multinational drug companies.

For instance, CSIR laboratories have marketed three new drugs: centbucridine (a local anaesthetic), gugulipid (a hypolipidaemic agent) and centchroman (an oral contraceptive). These drugs were developed after years of research and clinical trials.

CSIR has also marketed vitamin B-6 using a novel process for the first time in the world, Butachlor, weedicide for rice, which was the monopoly of Monsanto Company of the US.

It has also produced and marketed in 1987 triacantanol, a plant growth promoter from tea waste which could increase crop yield by 10 to 20 per cent.

The technology of triacantanol has been exported to Indonesia as well.

One of its laboratories has developed and marketed the technology of producing chromium metal. A small unit to produce chromium has already been set up at Rourkela in the private sector. The council has also received enquiries for setting up a similar plant in Indonesia at a cost \$1 million and negotiation have begun.

In 1987, the council also developed an automatic visual range assessor to assess the visibility range of aircraft and this has already been installed at the Indira Gandhi International Airport at Delhi.

In collaboration with TISCO, the council has developed a new chemical called Metasave, useful for pickling of steel: TISCO will make a saving of Rs. 30 lakhs a year from the use of this chemical.

1 MT OF IRANIAN OIL FOR INDIA

India has begun lifting one million tonnes of Iranian crude under a trade agreement signed last year which was delayed due to differences over Iranian imports of Indian goods.

According to information available at Bahrain on Jan. 23rd nearly 70,000 tonnes of crude have already been delivered and the remaining 30,000 will be lifted.

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Panel moots two new synthetic rubber units

The newly constituted expert group on synthetic rubber in the Department of Chemicals and Petrochemicals, has called for the setting up of two new synthetic rubber manufacturing units of one lakh tonnes capacity each to bridge the projected demand-supply gap in rubber by 20 AD.

The estimated investment in these factories would be about Rs. 120 crores each.

The group has suggested that the units could use indigenously available feedstock for producing synthetic rubber according to the Vice-Chairman of the group and President of the Indian Rubber Manufacturers Research Association (IRMRA), Mr. K.M. Philip.

Mr. Philip said that each factory would take about five years to go on stream. He was of the view that immediate measures should be taken to set up these factories to prevent massive imports of natural rubber.

The need to expand the synthetic rubber capacity was based on a study conducted by the group to assess the requirements of the rubber industry for all kinds of rubber by the turn of the century.

At a seven per cent annual growth rate, the demand for new rubber was expected to touch 8.35 lakh tonnes by this period, as against an estimated indigenous availability of 4.94 lakh tonnes on the basis of the present installed capacity comprising 4.40 lakh tonnes of natural rubber, 30,000 tonnes of styrene butadiene rubber (SBR) and 20,000 tonnes of polybutadiyl rubber (PBR). Of the gap of 3.41 lakh tonnes, to be made up of imports or by creation of new capacities for natural or synthetic rubbers, 95,000 tonnes would be accounted for special purpose rubbers, bulk of which would have to be imported. Thus, it would leave a deficit of 2.46 lakh tonnes to be met by 2000 AD. which could be made up either by natural rubber or synthetic rubber.

Import of such large quantities would entail an enormous foreign exchange outgo, Mr. Philip pointed out. The country could produce general purpose synthetic rubber equivalent in cost to the natural rubber produced in the country if feedstocks were available, he added. He was not very optimistic about a considerable increase in natural rubber production, the Rubber

Board's action plan to increase production notwithstanding.

Earlier, addressing the 14th conference of the IRMRA at Bangalore on Jan. 22, Mr. Philip said that the rubber inds. was "on a good wicket" having recorded a nine per cent growth rate in 1987-88. It had registered a moving average of seven per cent and a compound growth of 6.9 per cent during the 20 year period, 1966-86.

The requirement of new rubber in the current year, 1987-88 had already exceeded the projection of 3.52 lakh tonnes (natural rubber and synthetic rubber combined) and was expected to touch 3.60 lakh tonnes by March 1988, Mr. Philip said.

He said that the industry was not in a position to make several specialised rubber products required by ONGC and others on account of the whopping 240 per cent import duty on raw materials. These industries now import the finished goods which attracted a 100 per cent import duty. In the process, Rs. 30 crores of foreign exchange was being spent every year, Mr. Philip added.

Meanwhile, the DGTD panel on technological development and upgradation of the rubber industry, had made several important recommendations.

To enable the Indian rubber industry to manufacture sophisticated products as per international standards, all new types of synthetic rubber as chemicals not manufactured in the country, should be made available at a nominal duty under OGL.

Small scale industries should be given every assistance from a central institution to upgrade their technology.

— Open extension service by the IRMRA in Bombay, Calcutta, Delhi and Madras to give technical advice to small scale factories to enable them to manufacture rubber articles to standard specification.

— A rubber products testing laboratory should be set up by IRMRA with Central funds.

— IRMRA should be upgraded into a major rubber research centre with testing and advisory centres at all principal rubber producing centres. Necessary resources for this could be raised by a voluntary or compulsory contribution by the rubber industry.

IRMRA, the Rubber Board and

institutes such as IIT should be made the centres of training facilities for existing and new technical personnel in the rubber industry.

— The definition of synthetic rubber should be restructured so as to cover many new elastomers developed in recent years, under its scope.

— The Government should give incentive to machinery manufacturers to develop modern equipment. The present 85 percent duty on machineries, not indigenously manufactured, was a disincentive to modernisation.

Other recommendations of the panel related to energy and material saving measures.

Mr. Philip, who is a member of the panel, disclosed the recommendations of the panel in the course of his address. He pointed out that India was at least 20 years behind the developed countries in the area of rubber technology.

RUBBER R & D BODIES TO BE REVAMPED

The Union Government is planning drastic measures to revamp and revitalise the existing research institutions in the field of rubber to make their functioning more effective and relevant. This was indicated in Bangalore on Jan. 22nd by the Director of the Directorate General of Trade and Disposals (DGTD), and Joint Secretary in the Union Industry Ministry, Mr. Man Singh.

The way these institutions had been operating all these years gave "no credit either to the Government or the industry" despite the huge investment, Mr. Man Singh said.

"Very unpleasant decision" therefore, had to be taken to upgrade the standard of research done in these institutions and to pave the way for indigenous technology, and to enable the industry to have access to this technology. The Government was very particular that the small scale sector, which accounts for bulk of the rubber industrial units in the country, had the best technology at a reasonable rate, he added, while inaugurating the 14th rubber conference of the Indian Rubber Manufacturers' Research Association (IRMRA) in Bangalore, on Jan. 22.

Mr. Man Singh was critical of the tyre industry, which he said, wanted to be propped up perpetually by foreign collaborations. Even after 20 years of using foreign technologies, the tyre units came back to the Union Government for renewal of the collaborations.

ORDERS FOR HDPE PIPES :

plastics federation resents DGS & D move

The Indian Plastics Federation (IPF) has criticised the decision of the Director General of Supply and Disposal (DGS and D) for placing orders on the domestic units manufacturing HDPE pipes at the end of the year. Surprisingly, DGS and D has entered the domestic market when the international price of HDPE is going up, says a Financial Express Bureau despatch.

Disclosing this to newsmen Mr. M.L. Lahoti, President of the Federation, said that DGS and D authorities kept mum almost throughout the year. Suddenly they have started placing orders from November and at a time when domestic units cannot step up production even if they would like to honour them due to increase in HDPE price for the last six months.

According to him, the industry agreed in January last to supply HDPE pipes to DGS and D at Rs. 32.50 per kg. By the time it placed

the order, the price of raw material alone had gone up to Rs. 36 per kg. Taking into account, the conversion cost and other fixed costs, the selling price of the end product would be much higher than had been agreed by DGS and D.

Mr. Lahoti pointed out that the total demand for the plastic raw materials was about 6.5 lakh tonnes against the indigenous production of around 3.14 lakh tonnes, leaving a gap of almost 50 per cent. This gap was met by imports where the processors were to pay customs duty as high as 127.5 per cent. The Federation suggested to the Government to bring down the total effective rate of duty to the level of 60 per cent for LDPE, HDPE, and PP and 40 per cent for PVC. This has become all the more important in view of the fall in the value of Indian rupee and the heavy increase in the international prices for raw materials.

Mr. Lahoti is of the view that order to encourage the existing units and also to encourage the new entrepreneurs, the excise duty on plastic raw materials should be brought down to 15 per cent ad valorem. So far as naphtha is concerned the Federation demands that the petrochemical industry to be treated at par with the fertiliser industry. Fertiliser industry which consumed 80 per cent of naphtha was supplied naphtha at Rs. 2000 per tonne whereas the petrochemical paid Rs. 3534 per tonne.

Mr. Lahoti said that if raw materials prices were not brought down many of the tiny units would be compelled to close down, so far as woven sacks units were concerned already 50 per cent of 500 units were closed. The production capacity of these units was 360,000 bags per unit per month.

HBJ PIPELINE**EXTENSION TO PUNJAB LIKELY**

The Hazira-Bijapur-Jagdishpur (HBJ) gas pipeline may be extended to Punjab for power generation, according to the Punjab State Electricity Board chairman, Mr. N. S. Vasant.

"There is a distinct possibility of getting an extension of the pipeline from Sawai Madhopur," Mr. Vasant told a meeting of the Confederation of Engineering Industry (CEI) northern region at New Delhi on January 23.

He said during the informal talks with Central authorities, the state has been given to understand that the Centre may approve the extension of the pipeline. In fact, the Union finance secretary was the first to moot the idea of extending the pipeline from Sawai Madhopur to Punjab, he added.

Mr. Vasant said considering the current favourable attitude of the Centre towards assisting developmental projects in Punjab, the extension of the pipeline was on the cards.

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LEANINGS FROM THE PRESS

Lessons from Neyveli

The Financial Express comments editorially:

With a string of records already in their possession, the management and workers of the State-owned Neyveli Lignite Corporation (NLC) should understandably be less enamoured of fresh public approbation for a work well done. Even so, they do deserve compliments for completing and commissioning ahead of schedule the third and final unit of the first phase of its second thermal project. With this, NLC's total installed capacity goes up to 1,230 mw. No less praise worthy is its record of capacity utilisation. At a time when State Electricity Boards are struggling to achieve even a mentionable load factor, NLC has been consistently reporting upwards of 75 per cent load factor even for its first 600-mw station. This is not a mean achievement. But the one important lesson that needs to be learnt from NLC's performance is that it is not so much any external patronage or assistance as internal managerial leadership and employee involvement and dedication that contribute to the success of any undertaking. NLC did have its moments of anxiety and disappointment. Far from being overawed by them, the management and workers strove hard to overcome them with remarkable success. In some way, NLC's success story also demonstrates what a State-owned undertaking could achieve despite the many constraints, real and imaginary, that tend to cramp its efficient functioning.

Having proved its mettle, NLC must now widen its horizon. Theoretically, it has the potential to generate as much as 9,000 mw of power. For the moment, plans for opening three more mines with a total lignite capacity of 20.5 million tonnes per annum capable of supporting an additional power generating capacity of 3130 mw have already been drawn up. This apart, NLC has also expanded its activity to Rajasthan where it plans to open a mine at Barsingsar in Bikaner district to feed a plant of 2 x 120 mw. Moreover, geological investigations in some areas in Tamil Nadu and Pondicherry have shown significant reserves of lignite. On current cal-

culatation, these could sustain a power generation in these new locations of 1000 mw. Implementation of the present and proposed plans will doubtless entail massive investments. But this is certainly worth the game given the near absence of alternative fossil fuel reserves in the four southern States and the mounting opposition to big hydel projects and nuclear power stations from environmentalists. Almost all the hydel schemes in Kerala have run into ecological controversies. The State's proposed thermal station is still far from certain. The story in the case of Karnataka and Andhra Pradesh is not any different. Tamil Nadu's proposals for new thermal stations continue to be tossed about from one decision-making centre to another. Influential quarters have no doubt been lobbying for mini and micro hydel schemes. While they do have a good case, it is arguable whether the massive power requirement of the southern States could be fully met by such schemes, even con-

ceding for the moment their economic viability. It is against this background that the need to develop NLC into a power house of the South ought to be viewed. Its performance record shows that it has the credentials for the task.

KARNAL REFINERY TO BE READY BY '92

The oil refinery, being set up in the joint sector, at Karnal in Haryana, with the financial and technical assistance of the Soviet Union would start functioning by the end of 1992, Union minister of state for petroleum and natural gas Mr. Brahm Dutt, said at Bhatinda on 20th January.

Mr. Brahm Dutt, said the Rs. 1,400 crore-refinery would refine six million tonnes of oil annually and meet the oil requirements of Punjab, Haryana and western Uttar Pradesh.

He disclosed that Bhatinda in Punjab would be linked with Kandla by an oil pipeline with an oil terminal here to fulfill the needs of oil products of Ferozepur division.

This pipeline would also serve Rajasthan and Haryana.



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HBJ pipe dream

The HBJ gas pipeline continues to make news. Ever since the first phase of the project was completed in last August, the Gas Authority of India Ltd. (GAIL) has been crying hoarse about the absence of takers for its gas. But suddenly the situation has changed. GAIL is not able to meet the present demand of even a limited number of gas users. The mammoth pipeline has been able to release only small quantities of gas, thereby upsetting the production schedules of downstream industries. In a way, the incapacity of some user-industries to set up units as planned should now be considered a blessing in disguise. Otherwise, the loss to entrepreneurs would have been staggering.

Apparently, there are some technical difficulties afflicting the pipeline work. Since the project is not fully completed, the foreign companies are still on the job and they could perhaps be depended upon to take suitable remedial action. It is not clear at the moment what the nature of the malady is, GAIL would do well to take the public into confidence about the whole affair lest rumours should circulate. Some of the leading business houses, for instance, have ambitious plans to put up large fertiliser plants based on HBJ gas. These plants cannot be financed without mobilising resources from the capital market. The business houses have their own apprehensions about the response of

investors in view of the uncertainty about the profitability trends in the fertiliser industry. If there is, in addition, an element of uncertainty about uninterrupted availability of gas from the HBJ pipeline, investors may ignore calls for investments in this area. For the time being, the public sector units are bearing the brunt of the uncertainty.

One of the public sector fertiliser plants which has just gone on stream, the first recipient of the new gas facility, is said to be unable to utilise its capacity in full because of the low pressure of gas supplied from the pipeline. The Aonla plant of the Indian Farmers' Fertiliser Co-operatives (IFFCO) is ready to start production but GAIL seems to be in no position to supply gas. If these reports are true, something is rotten in the state of Denmark. The HBJ pipeline is one of the nation's leading development projects. The total outlay on the project is about Rs. 1,700 crores and it is supposed to generate investment of Rs. 9,000 crores among the user-industries. Will GAIL set things right before it is too late?

—Courtesy: The Economic Times

HIGH TECH PARKS

The technology parks that the Defence Research Development Organisation proposes to set up at Hyderabad, Dehra Dun and Bangalore may be small exercises in themselves

but they do reflect the growing awareness of the need for such high tech areas. It has been recognised the world over that in an era of rapidly changing technology, the time lags between research and industry have to be drastically reduced. And the setting up of industrial areas with a concentration of high technology industries and research organisations should serve this purpose. The success of some of the experiments, notably the Silicon Valley in the US., the M4 corridor in the UK and the Tsukuba science city in Japan, has contributed to a rapid growth of such cities. In India the need for such cities is even more urgent.

Given the magnitude of the problem, the technology parks that have now been proposed are at best only a small first step. They aim at catering primarily to the needs of the industry around which they are set up. For instance, the technology park in Bangalore will be set up near the Aeronautical Development Agency and would concentrate on aerospace and avionics. But if they are to be the forerunners of a series of such parks, several larger changes will become necessary. The telecommunications network which is an essential requirement for a science city would have to be improved. In order to attract the best technical personnel the urban services provided will have to be raised.

The Economic Times

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plastic industry at crossroads

The plastic industry which made an entry into our country in the fifties with household items has diversified into a number of sophisticated articles — both industrial and consumer products. The potential of plastics to replace a variety of materials and low energy required for the mfr. and conversion of plastics compared to other materials, especially metals and glass, has made plastics a very important material of construction for numerous applications. In addition to commodity thermoplastics like LDPE/LLDPE, HDPE, PVC, PP, PS, growth of engineering plastics viz. ABS, nylon, polyacetals, polycarbonates etc. for usage in electronics, communication, automobiles and several other industries is also expected to increase in the country. From 80 units in 1956 engaged in the processing of plastics, the number has increased to more than 12,000 writes A.K.A. Rath in the **Financial Express**.

The apex committee for perspective planning of petrochemical industry (1986-2000) has projected demand of plastics from the 1985-86 level of half a million tonnes to 1.8 million tonnes by 1994-95 and 2.6 million tonnes by 2000, as shown in Table-I. To meet this demand indigenously, six crackers and five aromatic complexes are required to be set up and the total investment envisaged is Rs. 23,000 crores. Further, downstream processing of plastics into consumable goods would involve an additional investment of Rs. 12,000 crores. Taking an average investment of Rs. 10 lakhs per unit, this would mean setting up of 120,000 plastics processing units. The committee has also recommended setting up a plastics promotion and development authority (PPDA), centres for promotion of plastics in specified industries such as automobiles and electronics, a data bank to support information needs of the Government and industry, testing facilities for raw materials and end products, creating indigenous capacity for speciality polymers and engineering plastics and modernisation of local machine-building industry and tooling facilities.

The Union Government has set up a 25-member National Development Council under the Chairmanship of Secretary, Department of Chemicals & Petrochemicals, to look

into the growth and development of the petrochemical industry. It is also learnt that the Government plans to set up seven petrochemical complexes including Haldia petrochemicals, Saleempur aromatic complex, Madras aromatic complex, Gujarat cracker, Mangalore petrochemicals and Visakhapatnam petrochemicals in addition to Maharashtra cracker which is under an advanced stage of implementation.

While the plastics industry appreciated the immense demand potential reported by the Government apex committee, it got the first shock when it learnt that for term loan financing of plastic processing, IDBI would examine each and every application submitted to the state financial institutions for refinance, irrespective of investment and product-mix. The reasoning put forth by IDBI was that there was no scope of setting up plastic processing units considering the shortage of raw materials. Prices of some of the commodities, especially LDPE firmed up the world over, shooting up from \$ 600 to \$ 1,000 per tonne in a very short span of time. To offset such a sharp increase in c.i.f. prices, the Government, in view of the representations made by the plastics industry, restructured imports duty in September 1987 to bring down the landed prices on par with the indigenous ruling prices. This was expected to facilitate easy imports of plastic raw materials. Further, most of the commodity plastics are under OGL. Thus, it appears that the plastic processors should not have difficulty in getting adequate quantity of raw materials for processing. In view of this, it may be prudent on the part of IDBI to review its policy on refinancing the plastics processing industry.

The industry received another shock when the Union Government decided to suspend further licensing in the petrochemicals sector. Apparently, this followed intervention of the Finance Ministry which was quite concerned over the desirability of taking up such high "domestic resources cost" projects. The Finance Ministry appears to be of the opinion that licensing in the petrochemicals sector should be suspended for the time being, considering

the high capital intensiveness of these projects, to facilitate diversion of resources to the crucial sectors of the economy.

In case the financial institutions are also asked to stop further assistance, it would be a severe blow to this sector which appeared to be having a growth potential in spite of demand recession in other sectors of the industry.

After a long conservative policy followed by the Government in approving fresh capacities for petrochemicals, a liberal licensing policy was adopted in 1986. Further, minimum economic capacities to achieve economy of scale were also announced. This has resulted in a large approved capacity and a flow of large number of applications from private as well as public units seeking approval for additional capacities.

The Government has also not been approving any projects based on the continued imports of basic raw materials i.e. all the projects approved were expected to tie up with the indigenous sources of raw materials, already approved. Whereas setting up of crackers is proposed to be suspended, it may also not be easy to import basic building blocks viz. ethylene, propylene and butadiene as elaborate transportation, handling and special storage facilities are required to be created. Moreover, these products are not traded in the international market in large quantities.

It will be interesting to examine how realistic the demand projections made for petrochemicals by the Indian Chemical Manufacturers Association in 1978 are. From the figures in Table II. it may be observed that the variation is not very wide considering that the demand projections were made on the major assumption of free availability. It is often acknowledged that the low level of indigenous demand of plastic materials is due to inadequate indigenous production. Though polymer resins are under OGL, most of the processing units are not able to take full advantage because of formalities involved and large quantities required to be imported for easier shipment and also due to paucity of working capital. Plastic manufacturers asso-

TABLE — I
DEMAND PROJECTIONS FOR PLASTICS
(1,000 tonnes)

Polymer	Demand projections		
	1989-90	1994-95	2000 AD
Commodity thermo plastics			
LDPE/LLDPE (as LDPE)	229	482	708
HDPE	178	378	555
PP	72	286	420
PVC	233	485	713
PS	38	82	120
Sub total	750	1713	2516
Small volume thermo plastics			
ABS	12	24	35
PMMA	10	16	24
Thermosetting moulding powder			8.9
PF	7.0	8.1	5.4
UF	4.3	4.9	2.7
MF	1.3	2.1	
Performance Polymers		4.5	
POM	1.3	5.0	—
PC	1.5	16.0	—
PA	8.0		—
Total plastics	785.4	1793.6	2592
or say	790	1800	2600

TABLE — II
DEMAND FORECAST AND ACTUAL DEMAND

Year	(,000 tonnes)							
	LDPE		HDPE		PVC		PS	
	Demand forecast	Actual demand	Demand forecast	Actual demand	Demand forecast	Actual demand	Demand forecast	Actual demand
1979	81	75	51	63	90	82	21	12
1982	122	105	71	74	144	105	31	17
1983	144	116	80	79	166	127	37	21
1984	161	134	88	90	193	156	39	20
1985	185	145	97	115	224	165	41	25
1986	213	180	107	140	260	180	43	30

TABLE — III
GAPS IDENTIFIED BETWEEN DEMAND AND SUPPLY

	1989-90		1994-95		1999-2000	
	Qty. 1000 t.	Amt. million \$	Qty. 1000 t.	Amt. million \$	Qty. 1000 t.	Amt. million \$
LDPE/LLDPE	35	35	256	256	490	490
HDPE	105	105	206	206	383	383
PVC	120	120	273	273	501	501
PS	17	27	43	68	81	128
Total foreign exchange outflow		287		803		1502

ciations and state small industries corporations can play an important role in this area. Further, because of fluctuations in the global market and upswing of major currencies from time to time, the disparity between indigenous and imported prices will continue to remain and it may not be possible to restructure imports duty every now and then. The apex committee has identified gaps in demand and indigenous supply of plastics, listed in Table III. At the current level of prices, the foreign exchange outgo for imports to bridge the gap between demand and supply is also listed in this table.

HALDIA PETROCHEM PROJECT CAPACITY

CENTRE WARY OF VIABILITY

The Centre still has reservations about the techno-economic viability of the Haldia Petrochemicals project at an annual capacity of 1.3 lakh tonnes. Indicating this at Calcutta on January 20, West Bengal finance minister, Ashim Dasgupta said that Union finance minister N.D. Tiwari had apprised chief minister, Jyoti Basu of this fact when the two met in the capital on January 19. Mr. Tiwari, in reply to Mr. Basu's queries as to why the clearance for the project was being delayed, had told him that doubts regarding the feasibility of the naphtha cracker of the present size still persisted, Dr. Dasgupta said.

However, the Centre has agreed to refer the project to experts and apprise the state government about its viability within ten to 12 days, the minister said. He added that if the project was further delayed, the chief minister would have to 'go to the people,' since the people of West Bengal had been anxiously awaiting its clearance. The finance minister noted that the project would have to be viewed in its entirety, including the downstream projects while deciding its feasibility at 1.3 lakh tonnes per annum capacity. A plant of 2.5 lakh tonne per annum capacity was required where naphtha was the sole product, he said, referring to expert opinions. The point relating to the extent of promoters' contributions had not been brought up by the Centre, he said.

INAR ON

High Performance Coatings and Printing Inks for Plastics

focus attention on the increasing applications of coatings in high performance fields, Colour Society, Bombay, had organised one-day seminar on 'High Performance Coatings and Printing Inks for Plastics' in Bombay recently.

The field of coatings has undergone tremendous innovations over the years with increasingly stringent demands being put on various fields as diverse as oil exploration, protection of buildings and structures, environmental protection of factories, transportation, space applications etc. In the packaging front, the widespread introduction of new packaging materials viz. plastics in various forms have necessitated the development of printing techniques, inks etc. to meet exacting specifications. These two themes were combined together at the seminar and as many as nine papers were presented by experts from industry, academics and the national laboratories.

Shri I.L. Budhiraja, Group General Manager (Production), Oil and Natural Gas Commission was the chief guest at the seminar. Addressing the audience Shri Budhiraja commented that with several lakh square meters of largely mild steel located in the corrosive environments of Bombay High and other offshore platforms, ONGC was constantly on the lookout for protection measures which would improve the service life of these structures. Lamenting on the need for frequent maintenance (once every three years as compared to once in seven years abroad), he urged the paint manufacturers to improve particularly techniques of surface preparation so as to ensure better adhesion of the coatings on the surface. Admitting that the need to keep production going at all times eliminated many of the surface preparation techniques leading to compromises in the quality of the surface prepared for coating he urged the industry to investigate newer techniques such as vacuum blasting. Protection of surfaces by using protective tapes as against coatings, development of paints which would make substrates invisible to radar, as also heat and fire resistant paints were some projects that ONGC would be interested in associating with, he added.

Dr. A.V. Pradhan, Secretary, Seminar Committee, The Colour Society proposed a vote of thanks. The inaugural session was followed by four technical sessions, wherein a

number of papers were presented. The following are the abstracts of the papers presented.

PROTECTION OF REINFORCED CONCRETE, by Dr. A.S. Manke, Shalimar Paints Ltd., Calcutta.

Reinforced concrete, the most extensively used material of construction, is subjected to ravages of destructive forces during its service life which reduces its strength and may cause even premature failure.

Ingress of carbon dioxide and subsequent carbonation reaction reduces the alkalinity within the concrete and initiates corrosion of the reinforcement steel resulting in the cracks and spalling of concrete.

Corroded reinforcement steel can be protected with a special epoxy paint and subsequently filled with a polymer modified cement mortar which also have resistance to the diffusion of carbon dioxide.

The most effective way of preventing the corrosion in concrete is to apply a barrier coat having a high degree of impermeability to carbon dioxide in addition to good durability, resistance to water, chemicals etc.

STATUS OF ANTIFOULING PAINTS FUTURE PROSPECTS by K.P. Buch, Retd. Scientist, Naval Chemical and Metallurgical Laboratory, Bombay.

With development of heavy duty underwater anticorrosive compositions and augmentation with impressed current cathodic protection systems, corrosion of submerged structures in our severe tropical waters has been contained and protection against corrosion for a period upto 10 years is now feasible. Marine biological activity in tropical waters pose greater challenges.

As on today, protective measures against settlement biogrowth particularly on less mobile or static structures like ships under outfit, offshore platforms, cooling water systems of nuclear power stations are not commensurate with those of corrosion prevention.

The paper outlines deleterious effects settlement of marine fouling, factors affecting this activity, as well as long term implications of such settlement. The paper briefly outlines

present status of anti-fouling measures. It also analyses mechanical means for inhibiting such growth. The author highlights work in progress on new approaches to meet this challenge and take effective measures to contain this menacing activity.

HIGH PERFORMANCE COATINGS FOR INTERIOR STRUCTURES OF SHIPS by Y.P.S. Nirvan, Naval Chemical and Metallurgical Laboratory, Bombay.

The need of long term protection of interior structures of ships does not require any emphasis. This would reduce the efforts spent on frequent painting of structures and also prolong the life of the ships. High performance coating system seems to be the only way to achieve the task of prolonged protection.

Solvent free compositions based on epoxies or polyurethanes are the necessity of environment conscious age of today. Such compositions in view of their good resistance to variety of environments could be used for different areas of ships and can help in avoiding multiplicity of present day paint systems for interior structures of ships.

The paper discusses in brief solvent free epoxy and polyurethane systems. Some data on diglycidyl ether of Bisphenol-A and diluent combinations are presented in the paper.

PLASTICS SUBSTRATES FOR PRINTING by D. Jain, Cosmo Films Limited, New Delhi.

The paper briefly describes the various types of plastics substrates on which printing or coating is carried out. Of these, the films, generally tend to be more problematic both in terms of handling on the machine as well as ink-coating adhesion. Effect of various additives on biaxially oriented polypropylene, polyester and certain other films is discussed as they affect the printing process and other surface properties.

Special attention is focussed on the role of corona discharge treatment of films to improve printability. Some case studies are presented where surface modification was carried out to enable better handling of films on machines for printing or final product packaging. Overall the author hopes to present specific qualities and structure of different films that would help the converter do a better job

FLEXO & GRAVURE INKS FOR PLASTICS

by Dr. V.K.V. Unni, Coates of India Limited, Bombay.

Flexography and Rotogravure are generally continuous printing processes. Various plastic films used for packaging are printed in reel form either by flexo or by gravure.

Plastics are organic compounds based on synthetic polymers or modified natural polymers. The most important property of all plastics is their ability to flow under application of heat and pressure. This allows them to be made into any shape including films in reel form particularly used in large quantities in the packaging industry.

Flexo and Gravure Inks

Unlike the inks used in letterpress and offset which are pasty in consistency Flexo and Gravure inks are liquid in nature. They are composed of:

1. Colouring matter — Pigment or Dye.
2. Binder/Resins — Acts as a dispersing medium, carrier and adhesion promoter for the pigment and also imparts particular end usage characteristics.
3. Solvents — To dissolve the resin, to keep the consistency proper for transfer of ink to the substrate, evaporate after the ink is transferred to the substrate.

Ideal requirements for an ink for plastic film can be listed as follows:

1. Excellent printability.
2. Good adhesion.
3. Good gloss
4. High flexibility matching that of substrate.
5. Scratch and rub resistance.
6. Product resistance properties, (soap, detergent, essential oil, dairy products, vegetable oils, etc.).
7. Suitability for use in adhesive and extrusion laminations.

Flexography

Like letter press flexography is a relief printing process. Plates are usually made of rubber, inks are solvent based and fast drying in nature.

Rotogravure

Gravure is an intaglio process. Printing areas are screened to provide a support for the doctor blade. In conventional gravure, varying tones are produced by varying cell depths.

Both gravure and flexo inks are very similar in composition except that they have limitations in selection of solvents. In flexo, solvents, like toluene, ketones, etc. which attack rubber rollers and stereotypes cannot be used. This will limit the selection of resin as well since resins which can be dissolved in only these solvents, cannot find any use in flexo inks.

Application

Large volumes of both gravure and flexo inks are being used for printing plastics. Plastic film such as Cellophane, Polythene, Polypropylene, including BOPP and coextruded films. Polyester and PVC-inks are both used for surface printing and reverse printing. Reverse printed materials are mostly laminated (adhesive or extrusion) to suit to the specific end uses with either paper, polythene, foil, etc. Basic ink formulations vary depending on:

1. The printing process — Flexo or Gravure.
2. The substrate — Polythene, BOPP, Polyester, etc.
3. Surface printing or reverse printing for lamination.
4. Packaging Product — Food products, oil, soap, detergents, medicines, etc.

COATING FOR PROTECTION OF METALS AT HIGH TEMPERATURE by M.K. Banerjee, M.N. Singh, A.K. Dey, and K.P. Mukherjee, National Metallurgical Laboratory, Jamshedpur.

High temperature oxidation/hot corrosion can be controlled by more oxidation resistant alloy making or by providing with suitable protective coatings. But approaches are critically examined and it is believed that the coating approach can prove to be more technoeconomically viable. Coating scheme has been proven to be successful in steel making furnaces, gas turbine engines and check valves, liners for molten metal troughs, receptacles handling corrosive liquids, heat exchangers, other high temperature furnaces, pumps for diecasting machines and combustion tubes etc.

Basically high temperature resistant coating materials should resist all adverse effects and maintain their mechanical function under the operating conditions of high temperature and corrosive condition. One should therefore concentrate to achieve good resistance to corrosion, heat transfer coefficient, low expansion co-efficient, high thermal shock resistance and high strength at elevated temperature.

Silicon carbides or alike compounds good candidates materials for coatings. The refractory compounds show promises well attempted as particulate materials for formation of the high temperature coatings. For example, Silicon, Silicates, Organo silic compounds, Carbides (e.g. silicon carbide, boron carbides, alumina-silicon carbides, Borides (e.g. titanium diborides), Nitrides (e.g. silicon nitrides, aluminium nitride, boron nitride etc.) and miscellaneous mixture compositions including carbides and oxides etc. have been successfully attempted. Besides these there are other efficient varieties including Graphite, Yttrium and Hafnium refractories. Fundamental aspects of a high temperature resistant coatings can be understood in analysing basic oxidation reaction of the specific metal and the adhesion characteristics of the coating with metal. The process of the oxidation of metal is generally a diffusion phenomenon accelerated by thermal and mechanical cycles. Oxidation leads to multilayer growth of scales and their break away depending upon time, temperature etc. and thus most scales are non protective at thermal cycles ordinarily encountered in continuous processes. The primary function of the coating is therefore to reduce ionic diffusional transport and multilayer growth of scales by building an optimized thin scale or interphase. This necessitates proper bonding and/or incorporation of coating particulates into the oxide lattice of substrate metals.

Theories based on 'Intermediate layer formation', 'Oxygen bridging' and 'Electro Chemical Characteristics' have been put forward to explain the mechanism of protection by high temperature coating. But the common concept relies in the formation of protective interphase upon which depend the protective life of the coating. Major efforts are thought to be necessary to study the oxidation behaviour, microstructural stability, and overall system reliability. Use of Al_2O_3 SiO_2 as particulate additives is common in the present technology. Coating that form complex oxide spinels or device glasses may provide a major advantage in performance capabilities. Such coatings additionally possess a self healing character and thus ensure better and longer service performance. Coating of the fusible slurry type are regarded as having the best potential for meeting the techno-economic aspects of future needs.

In view of the fact, it may be concluded that for futuristic approach further insight into the fundamentals and performance of existing coatings is needed to provide a sound basis for developing advanced coating systems. R & D work initiated at the National Metallurgical Laboratory are based on the approach

over the metal surface by a green slurry and subsequently heat the surface to form an agglomerated and fused glass coating which have good mechanical flexibility and oxidation resistance. Coated surface with a formulation containing 5% particulates (complex oxides) gave better performance (protection) even at 800°C for 4 hours.

POLYMERIC SYSTEMS FOR ANTI-CORROSIVE TREATMENT IN FERTILIZER INDUSTRY by Dr. R.K. Jain, Central Building Research Institute, Roorkee.

Survey of Fertilizer plants to study corrosion problems of building materials revealed improper choice of anti-corrosive treatments and faulty workmanship lead to early failure needing frequent repairs and maintenance resulting into colossal loss of money and material. Indian Standards or Codes are not available on various anti-corrosive treatments required for different situations. There is a lack of dissemination of knowledge amongst different plants and no feedback information is available in a systematic way. Existing protective treatments are inadequate and costly in a large number of situations.

IPN polymeric materials are of recent origin and have improved unique properties in comparison to ordinary polymeric systems. Epoxy/Phenolic IPN systems were developed and compared with neat epoxy systems for various chemical and physical properties. The new systems have been found to behave better and more durable as revealed from laboratory and field trials. Urea bagging plant of IFFCO, Phulpur has been treated with new IPN materials and the performance has been found satisfactory for last two years.

HIGH PERFORMANCE POLYIMIDE COATINGS FOR ELECTRONIC AND SPACE APPLICATIONS, by E. Devadoss, Solid Propulsion, Propellants & Chemicals, Vikram Sarabhai Space Centre, Trivandrum.

A fruitful combination of outstanding performance parameters such as continuous service capability at high temperature (500°F), wear resistance, low friction, toughness, thermal stability, high dielectric strength, radiation resistance and low outgassing coupled with improved tractability of the recipes available in the aromatic polyimides, (both condensation and addition type) make them the most sought after candidates in modern avionic applications.

Excitements in crystal growth, solid state diffusion, ion implantation and packaging of microelectronic devices which are going smaller and smaller, exploit many novel ver-

sions of polyimides in -

- (i) fabrication aids -- as planarisation layers, multilayer photoresists and masks
- (ii) passivants as barriers to contaminant ion mobility
- (iii) Inter level insulation materials capable of withstanding the high processing temperatures and
- (iv) adhesives and flexible circuit board materials.

Recent trends in the material and processing aspects pertaining to some of these applications are summarised.

POLYURETHANE COATINGS FOR CORROSION PROTECTION by M.K. Trivedi, S.N. Malhotra (Department of Metallurgical Engineering, IIT) and H. Venkatasubramanian, Department of Chemical Engineering, IIT, Bombay.

Polyurethane resins result from the condensation of polyisocyanates with polyols. These resins are being extensively used for industrial applications, railways, ships, as lining materials for chemical equipments and many more. Since polyurethanes impart excellent abrasion resistance, these resins are recommended wherever surfaces of materials have to be prevented from friction and erosion.

The present paper reports the work done on two-component polyurethane system (polyol curing) and the effect of crosslinking on corrosion protection. In order to achieve desirable properties in polyurethane films, it was thought to take polyester polyol as one of the component.

For the synthesis of polyester polyol the reactants such as adipic acid (1 mole), ethylene glycol (0.75 mole) and propylene glycol (0.5 mole) were charged into a resin kettle and heated to 140°C for specified time. Several polyester polyols were thus prepared. The polyester polyols which had the acid number less than 10 and hydroxyl number less than 200 were chosen for further condensation.

In addition to the above polyols, four prepolymers -- (1) Toluene diisocyanate (TDI) and Glycerol; (2) TDI -- Propylene glycol; (3) Diphenyl methane diisocyanate (MDI) and glycerol; (4) MDI -- Propylene glycol -- were prepared. The four prepolymers were stored under constant temperature and moisture free condition.

The solvent, ethyl acetate used was purified by a process which made it completely free from all impurities such as water, ethanol and free acid. The polymers were mixed

with the polyester polyols (the second component) to obtain the coatings. The pot life of the polyurethane resin prepared after mixing was around 2 hours.

The mild steel specimen were first treated as follows. The steel was degreased with trichloroethylene followed by acid pickling as per standard procedure. During acid pickling inhibitor sodium phosphate was added. The pickled steel was then subjected to phosphating and the phosphated samples were dried in air. They were then kept in a dust free atmosphere.

The coatings were characterised by hardness measurement, adhesion and abrasion tests. The thickness of the coatings were found out by using a magnetic gauge. To ensure good reproducibility of the results, the thickness of the coatings of all samples were kept nearly the same for all the tests.

The coated mild steel panels were subjected to the salt spray test (CASS) and all the samples were found to be unaffected, thereby showing that the coatings offered good corrosion protection. The same results were obtained by the potential-time studies in 3.5% NaCl solution for the samples.

Hardness of the polymer film was found out by using pencil hardness method. The polyurethane films based on propylene glycol was found to be soft whereas the films based on glycerol were as hard as 6H.

The adhesion of all the types of polyurethane films were found to be good. The abrasion resistance of the propylene glycol based polyurethane resins were found lower than that of glycerol based ones.

The flexibility of the coatings were found to be good and could withstand 90° angle bend test. Propylene glycol based polyurethane films were found to be more flexible than glycerol based ones.

TGA analysis showed that the polyurethane resins prepared were stable at 100°C in a 72 hour test.

It was found that polyurethane coatings based on multifunctional alcohol such as glycerol offered a better crosslinking density and better hardness and abrasion resistance to mild steel than that of resins based on bifunctional alcohols such as propylene glycol.

This could be achieved without sacrificing the flexibility of the resin film and the corrosion protection offered by the films to mild steel.

'Advances in Pesticide Formulation Technology'

With growing concern in both industrialised and developing countries of the world about potential ecological risks associated with pesticides growing emphasis is now being attached to pesticide formulation science as a way to getting toxic ingredients safely, directly and effectively onto the target to which these pesticides are applied. Numerous ingredients are hence added to the pesticide formulation to meet this demand and developments in this class of materials termed Speciality Chemicals was the subject of a one-day seminar organised by Indian Explosives Limited (IEL) in collaboration with their parent, ICI Speciality Chemicals. The seminar titled 'Advances in Pesticide Formulation Technology' was presented by Mr. L. Rogiers, ICI Speciality Chemicals, Brussels.

In India formulations marketed fall into the categories of Emulsifiable Concentrates (E.C.) Wettable Powders (W.P.) and Water Dispersible Granules (W.G.). While substantial research work has been done in improving chemical and physical stability of these formulations and even distribution and retention of active ingredients considerable work is being carried out in developing new types of formulations. These include:

1. Concentrated Emulsions

Eliminating the use of solvents these formulations are prepared by dispersing the active ingredient in water using suitable surfactants. Lower mammalian toxicity, lower phytotoxicity, lower cost and elimination of flash point problems are some advantages of

these systems. However, problems of production and restrictions on the types of active ingredients which can be used have limited the use of these formulations.

Suspo-Emulsions

These are concentrated emulsions with suspended active ingredients and are difficult to formulate. Nevertheless the ability to include two active ingredients represents a considerable improvement in formulation technology. Once again difficulties in formulation and in finding an ideal packaging material have restricted use.

3. Multiple Emulsions

Multiple emulsions of the oil/water/oil or water/oil/water type (particularly the latter) are resorted to protect active ingredients which are highly unstable or toxic or both. Multiple components of active ingredients is possible with such emulsions.

Other areas of development include suspension concentrates which again eliminate use of solvents and controlled release pesticides. The latter reduce considerably the phytotoxicity, mammalian toxicity and evaporative losses, providing same/higher efficacy at lower doses. The main types of control release systems used are -

- coated pesticide granules;
- polymer systems containing covalently bonded pesticides;
- matrix systems containing physically trapped pesticides
- micro-encapsulation.

The use of adjuvants in pesticides to produce a range of effects that enable the activity of the pesticide to be enhanced as well as broadened is yet another fascinating development in formulations. These chemicals which are usually (but not necessarily) surface active agents are capable of improving the biological activity of a pesticide because of basic physico chemical interactions with it. Use of these adjuvants results in reduction of level of pesticide usage, increased activity and wider spectrum of activity with inherent advantages in increased profitability, and greater market penetration.

IEL's plant

IEL, in collaboration with ICI Speciality Chemicals, has been working closely with many of the leading pesticide manufacturers. It has developed a range of surfactants that play an important role in giving the formulations desirable characteristics. IEL holds a licence for manufacturing surfactants. It proposes to launch a speciality chemical, which will enable production of moisture absorbent and easily washable synthetic fabrics, with the feel of cotton. This will be marketed as a textile auxiliary.

At present, the company has been producing this surfactant from imported intermediates. It proposes to set up a new plant at its Thane complex near Bombay to manufacture 1,000 tonnes per annum of this speciality chemical using indigenous raw materials according to Mr. Ranjit Shahani, Group Manager of Speciality Products of IEL.

Gupta Trading Silver Jubilee

The cream of the Bombay's chemical and dyes market - 'Vadgadi' had descended on the lawns of Shree Lakshmiranayan Temple Hall, Bombay on 9th January 1988, to felicitate Mr. Ramchandra C. Gupta and his firm

Gupta Trading Co. on the joyous occasion of Silver Jubilee of the company. Mr. Ramchandra Gupta, a leading figure in the field of chemicals import and trade, has a unique reputation of honesty and reliability.

Among the speakers who greeted and felicitated Mr. Gupta were: Mr. Ramnikal S. Gosalia, a doyen of Vadgadi market and Mr. Mahavirprasad Gupta of Mangala Bros., one of the wellknown importers and traders.

In his brief address, Mr. Gosalia recalled his association with Gupta Trading since last two decades. He said that Mr. Gupta was not only an expert in marketing but also in the matters of import policy, Sales-Tax etc. The Chemical & Alkali Merchants Association had always looked upon Mr. Gupta's views and guidance on these matters. Having migrated from Calcutta in early sixties, Mr. Gupta had cast his magic spell on the Vadgadi market. Mr. Gosalia was very happy to note that Mr. Gupta had established a charity trust at his birth place at Haryana and started a Girl's High School imparting free education to 400 girls. Mr. Gosalia extended his good wishes to Mr. Gupta and said that he was looking forward to the Golden Jubilee of Gupta Trading. Mr. Mahavir Prasad Gupta, while paying his tributes to Mr. Gupta, said that he was very proud to be associated in the function and was happy to see a such a large gathering of people from the industry.



Mr. Ramchandra Gupta of Gupta Trading Co. is seen gratefully acknowledging the greetings. At the extreme right is Mr. Ramnikal Gosalia and extreme left is Mr. M.P. Gupta of Mangala Bros.

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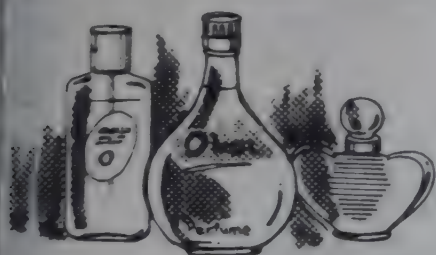
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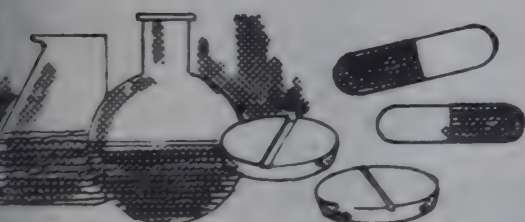
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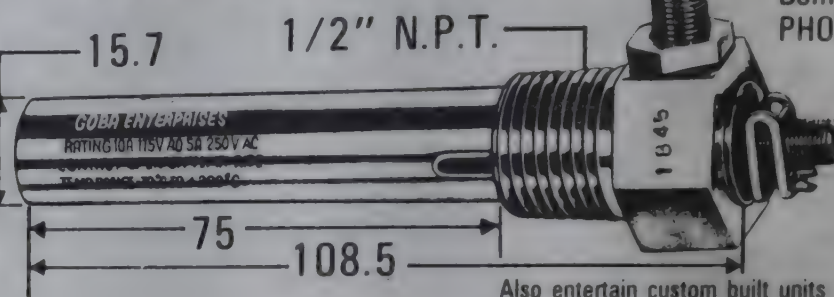
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POTLIGHT ON

Biotechnology & Life Sciences (Part 1)

JOINT RESEARCH PROJECT ON PRODUCTIVE YEAST ASSIGNED TO SIX JAPANESE COMPANIES BY MITI

Six Japanese private companies and Bioindustry Development Centre will launch in 1988 a joint research project on a commission basis for the Ministry of International Trade & Industry (MITI) for developing an efficient fermentation technology based on highly productive yeasts. The R & D period will be as long as six years.

This research project has the main objective to obtain new yeasts with good resistance to alcohol and temperature by means of gene modification and cell fusion as well as develop an efficient fermentation using the improved yeast. Among the companies are Kyowa Hakko Kogyo, Suntory, Sanraker, Godo Shusei, and Toyo Engineering. (*Japan Chem. Wk.*, 10/15/87, p. 1).

MONSANTO SYSTEM UNVEILED TO TRACK ENGINEERED ORGANISMS IN SOIL

Monsanto has applied to the Environmental Protection Agency for permission to field test a system to track the distribution and survival of genetically engineered microorganisms in soil.

Monsanto researchers have inserted genes into a soil bacterium that allows engineered organisms to be distinguished from naturally occurring microbes in a sample. The firm's researchers believe the marker system will prove to be an accurate way of tracking altered organisms once they have been

released into the environment. Eventually, other genes that control beneficial traits might be inserted along with the marker genes.

The marking system consists of two genes from *E. Coli* inserted into *Pseudomonas fluorescens* a naturally occurring soil bacterium that fluoresces under UV light. The transferred genes direct the *Pseudomonas* to produce β -galactosidase enzyme. That enzyme enables the altered bacteria to metabolize lactose (which bacteria that fluoresce cannot normally do) and thereby grow on laboratory culture dishes that contain only lactose as a carbon source.

For visualizing altered bacteria, a lactose analog called X-Cal (5-chloro-4-bromo-3-indolyl- β -D-galactopyranoside) is added to the culture dishes. Bacteria with the β -galactosidase enzyme split off an indigo-like chromophore from X-Cal and turn bright blue. Because only the engineered microbe can both use lactose and fluoresce, they can be distinguished from other blue colonies by placing the culture dish under UV light.

Clemson University scientists (working with Monsanto) plan to apply the organisms to the soil when they plant wheat at their South Carolina research station in November 1987, then monitor the microbes growth distribution and survival. They will dig up plants at regular intervals, bring them into the lab, and extract the bacteria. The researchers will also check untreated wheat in adjacent fields to see if the bacteria migrate there and will monitor how far down in the soil the altered organisms travel.

However, the above research plans depend with approval of EPA and the Department of Agriculture. The company is optimistic that the EPA will give it a thorough and complete review. (*C & EN*, 6/12/87, p. 6).

NUTRITIOUS CROPS, ANIMAL FEEDS AND EDIBLE PROTEINS VIA AGROBIOTECHNOLOGY

Agrobiotechnology is making slow but sure progress towards providing more nutritious crops, nutritious animal feeds and edible proteins for humans.

Molecular Genetics has employed tissue culture techniques to develop corn high in the amino acid tryptophan, which is usually deficient in animal feed and must be added by farmers.

Another American company Calgene has an agreement with Campbell Soup Co. to engineer strains of tomatoes with a higher total solid content. Campbell also is teaming up with Philip Morris (a cigarette manufacturing company) to develop tobacco plants with properties that make them better suited for cigarettes.

Another endeavour is the development of Single Cell Protein (SCP). Although the SCP projects of the 1970s designed to produce animal feeds by growing bacteria or yeasts on methane, methanol or other low-cost substrates -- never lived up to their promise, the technology pioneered by SCP developers is being spun off into new areas. In the UK, ICI, which abandoned its ill-fated Proteen brand of SCP animal feed, is using the 50,000 tonnes/year SCP plant to produce a mycoprotein for

human food. Phillips, meanwhile is using fermentation techniques gained from the SCP work to make pharmaceutical products. The yeast used in the process can be altered by r-DNA and grown in high densities on methanol to give relatively high yields of proteins. Also in the UK, Shell hopes to use some of the expertise it gained in studying the SCP from methane process, which it never commercialised, to develop products in agrochemicals, seeds and related areas.

At Biogen, researchers have induced gene-spliced microbes to churn out ample quantities of porcine growth hormone, which stimulates growth in young pigs. Field trials of the compound are under way. Similarly, Lilly is working on a r-DNA derived bovine growth hormone to speed up the growth of cattle. (*Chem. Wk.*, 9/30/87, p. 37).

F₁ (FIRST FILIAL) SPECIES OF ONIONS DEVELOPED BY KIRIN BREWERY (JAPAN)

Kirin Brewery Co. of Japan in collaboration with a seed and seedling company has reported successful development of a new F₁ (first filial) species of onions by means of tissue culture. The use of biotech technique has made it possible to develop the new F₁ species of onion in a far shorter period than by conventional methods requiring 7-10 years, reports Kirin Brewery researchers.

Most vegetables consumed in Japan are of F₁ type because these have good resistance to disease, insects and bad weather. However, their development require many years.

The new method via tissue culture of a male sterile strain has shortened the development period from the order of years to that of months. In

onions, F₁ species are rare. Therefore, the recent success will encourage efforts for developing newer F₁ species of onion inheriting better characteristics from the parents. (*Japan Chem. Wk.*, 9/29/87, p. 1).

A FULL RANGE OF NATURAL COLOURS FROM BIOCON (UK)

A full range of natural colours is now available to the food and beverage industry from Biocon (UK) Ltd. The company has been extracting and processing botanical materials for enzyme and hydrocolloid production, which has now been applied to developing natural raw materials into food colours. The company reports that it has pioneered the use of natural orange colours in soft drinks, as well as developed new ways of colouring biscuits and dry blended products. (*Food Manuf.*, 7/1987, p. 21).

SUCRALOSE A NEW HIGH INTENSITY SWEETENER FROM SUGAR ON THE HORIZON

Sucralose, a new high intensity sweetener from sucrose is 600-times sweeter than sugar. The product was jointly developed by Johnson & Johnson and Tate & Lyle (UK). Tate & Lyle discovered sucralose in collaboration research with scientists at Queen Elizabeth College (London) in 1976. An 8 year safety evaluation at Johnson & Johnson on animals and humans in USA and UK has shown that the product is safe for human consumption. Sucralose has no calories, does not promote tooth decay and exhibits an excellent stability over long periods of time. Even elevated temperatures do not affect sweetness.

This sweetener opens up new market for sugar. A major sugar-producing country like India should look towards developing this sweetener by even importing this technology as part of a programme for

developing industries based on sucrose as raw material. (*Food Eng. Intl.*, 5/1987, p. 17).

THE WORLD'S FIRST BIOTECH LIPSTICK DEVELOPED BY KANEBO (JAPAN)

Kanebo (Japan) has supplemented the bio-technologically produced range of colour cosmetics launched early in 1987 with the introduction of Bio-Lipstick based on a root used in traditional Eastern medicine.

The colouring agent and active conditioning ingredient contained in Bio-Lipstick is Shikonin, a deep red vegetable dye originally obtained from the now almost extinct Murasaki-gusa root. Cloning techniques developed at the University of Kyoto have enabled Kanebo to produce the dye in commercial quantity.

Shikonin has long been recognized in Asia not only for its potential as a dye, but for its soothing, healing and antiseptic properties. It also has, according to Kanebo researchers, an exceptional mucous membrane compatibility, which permits Bio-Lipstick to take effect directly on the lip surface. This results in the colour lasting longer, fading more naturally and acting as a conditioner for the delicate lips. (*Mfg. Chem.*, 11/1987, p. 17).

MAN, THE GREAT SCOURGE ON OUR GREEN PLANET

Just as geneticists and biotechnologists are learning how to utilize natural chemical resources and are beginning to crawl through the planet Earth's vast genetic library for useful compounds we are about to lose that diversity of species. The human race is a dominant ecological force and already it consumes or destroys about 40% of the world's

posynthetic activity. With global population projected to triple between 1950 and 2002 AD -- a highly a lifetime -- the damage will continue to an increasing rate. This presently makes homo sapiens the world's biggest pest.

is claimed by leading authorities that an area of tropical rain forest as large as the British Isles is being destroyed each year for agriculture. At that rate all the forest would be gone by 2067 AD. Quite apart from the danger to the global O_2 balance we are denying to ourselves, our children and our grandchildren the opportunity to utilize many of the plants, animals and microorganisms that exist now.

Some salient examples of past discoveries that could not be repeated if wild forest species were lost give a fright to many researchers in drugs and pharmacognosy. These are, for example, oral contraceptives from Mexican Yam, muscle relaxants from an Amazonian vine, the treatment of Hodgkin's disease from the rosy periwinkle of Madagascar. Many other kinds of plants offer extraordinary possibilities as sources of medicines, oils, waxes, fibres and other commodities of interest to our modern industrial society.

Plants are natural biochemical factories and genetic engineering opens up the possibility of transferring useful wild genes into cultured organisms. But half the world's biological diversity (estimated at 4.5 million species) is at risk, and only one-sixth of the tropical species in danger have so far been catalogued.

From a few today, the rate of extinction is expected to reach 100 species per day by the end of the present century. Even if they cannot all be conserved in their natural, leading geneticists suggest that they

should be preserved in seed or gene banks for future researchers.

Dr. Peter Raven, Director of Missouri Botanical Garden, criticised the poor record of USA in giving development and that could help to slow the trend towards destruction in Third World Countries. Of 17 advanced members of the Organization for Economic Cooperation and Development, the USA comes bottom in the amount of overseas aid it gives in proportion to its GNP. The actual number of dollars is still large, but two-thirds go on military aid. Yet the USA has most to gain from the international stability that would be conferred by setting up workable agricultural economics in the developing world. It is wasteful farming practices that are destroying the forests. Improved husbandry, more robust crops etc. could reduce some of the pressures, Dr. Raven emphasizes.

Recently, Prof. David Pimentel of Cornell University described one technique that could help in this line. He suggested that growing food and nitrogen fixing trees side-by-side on the same plot could help alleviate both food and fuel shortages in tropical countries. Using wood, dung or crop residues for fuel robs the soil of nutrients and exposes land to water loss and erosion. Using a nitrogen-fixing tree called *Leucaena*, Pimental reports, nitrogen can be put back into the soil, increasing grain yield by 50%. In this agroforestry system, one hectare could provide 1500 kg. of grain (enough for 4 to 5 people for a year) and 2000 kg. of wood (fuel for 2-3 people for a year). In addition, 2500 kg. of leaves and small twigs would be worked back into the soil and thus, combined with the alternating rows of trees and crops, would cut soil erosion. Pimental reports that the system would be sustainable, unlike typical low-fertilizer grain farming practised

today in the Third World. (*Chem. In Britain*, 5/1987, p. 407).

ICAR TO PARTICIPATE IN CONSERVATION OF PLANT GERM PLASM OF SOUTH & SOUTH EAST ASIA

An agreement for technical cooperation in conservation of plant germ plasm of South & South East Asian region was signed last November between Indian Council of Agricultural Research (ICAR) and the International Board for Plant Genetic Resources (IBPGR). It provides for opening a field office of IBPGR for the region in India.

At the recent workshop of IBPGR, Mr. G.S. Dhillon, Indian Minister for Agriculture, hailed the agreement. The minister pointed out that the region was the home of several major food crop and other economic plants and possessed enormous diversity in plant genetic resources. However, due to pressure on length as well as improper use most of these resources are now facing the danger of extinction. This situation demands urgent efforts to salvage and preserve the endangered plant species before they are lost for ever.

He reported India's National Bureau of Plant Genetics Resources (NBPGR) maintained international contacts with over 80 countries and had generated necessary facilities for long term storage of germ plasm. The Bureau's gene bank would have a capacity to store over 2.5 lakh collections. Besides, it has already established a national facility for plant tissue culture repository for 'in vitro' conservation of plant material.

A NEW CELLULASE ENZYME ACTIVE AT 75°C ISOLATED

Researchers at the Solar Energy Research Institute (SERI) at Golden, Colorado, have reported recently

that they have found a new cellulase enzyme produced by the bacterium *Acidothermus cellulolyticus* in the hot springs of Yellowstone National Park. Remarkably, the bacterium works best at 75°C in an acid solution of pH 5. The new enzyme outperforms all existing cellulases, which lose their activity above 60°C. (*New Sci.*, 10/8/87, p. 42).

HEPARINASE -- A NEW ENZYME DEVELOPED BY r-DNA TECHNOLOGY

Canadian researchers at Allelix Inc. and Continental Pharm Cryosan Inc. are pooling their resources in their effort to develop and manufacture heparinase, an enzyme that alters the behaviour of heparin -- an anticoagulant used in major surgery.

Heparinase is crucial in immediate post-surgical applications for restoring the blood's ability to clot. Two such operations necessitating the heparinase cited by researchers at Allelix are open-heart surgery and kidney dialysis.

Currently, CPCI holds several patents relating to the production

and medical applications of heparinase. Allelix, on the other hand, will contribute proprietary gene cloning and expression systems to the joint effort. The agreement, calls for Allelix to supply heparinase to CPCI for incorporation into the products and for distribution of the products by CPCI in North America.

The companies expect the research into application of heparinase and subsequent product development to lead to diversification of the technologies involved that may result in products for the treatment of cancer, atherosclerosis and rheumatoid arthritis worldwide. (*CMR*, 6/29/87, p. 9, 24).

A BIOTECH PROCESS FOR BIOTIN ON THE HORIZON

Global biotin production is estimated at about 15 tons/year. At present it is produced by a long and tedious organic synthesis process taking around three months duration. This makes the vitamin (of the B Complex group) very expensive (1 million yens per kg). Researchers at Nippon Zeon Co. have developed on

a laboratory scale an efficient fermentation process for biotin. Bacteria called *Sphericus* are employed for biotin production via fermentation. These bacteria exist in nature and have a high productive capacity for biotin. In the first step, raw material pimelic acid is fed to *Bacillus Sphericus*. The pimelic is transformed into biotin through 5 step. Precursors of biotin are subjected to enzymes for the synthesis of biotin.

The researchers at Nippon Zeon transplanted a Bio-B gene capable of transforming dithiobiotic acid (DTB) -- the direct precursor of biotin into *E. Coli*. The resultant micro organisms were then cloned in large quantities. The bio-B gene thereby obtained was transplanted again into *B. Sphaericus*. Biotin production was thereby markedly increased and as a result the researchers obtained 30 mcg of biotin per 1 ml. of culture medium. The reaction process was completed in a day. The company's researchers are aiming at establishing a commercial and further increase the production efficiency of this biotech process. This may take 2-3 years. (*Japan Chem. Wk.* 10/29/87, p. 1).

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Chemical Plant Developments

JAMES LOCK

Consulting Editor, *Processing*, London

RED LASER GAS DETECTORS

Thornton Research Centre of Research Ltd. has developed a gas detector that uses a red infrared light to detect any obstruction crossing its path. Shell has purchased the invention to Sieger Ltd., a company specialising in industrial gas and liquid analysers. Its laboratories can simulate virtually any conditions, enabling it to investigate problems and develop the most appropriate solutions.

The detector makes use of a red infrared and solid state electronics technology to provide a detector that is inexpensive, reliable and capable of giving considerably better protection than conventional catalytic devices. It also cuts the cost of installation and cabling involved in covering a plant with hundreds of point sources.

Instead of measuring the gas concentration at one point, this new instrument projects an infrared beam through the area where gas escapes occur. Gas will be detected if it crosses the beam anywhere along its path. As a result, escapes can be detected at an early stage. Shell values the inherent simplicity of this open path instrument, which has no moving parts, makes it very competitive with existing sensors.

Previous attempts to make a flame detector involved the use of ultraviolet lasers which, besides being expensive, needed high voltage supplies capable of igniting the escaping gas. The Thornton detector operates at voltage and power levels sufficiently low to ensure that escaping gas will not be ignited.

The instrument comprises a transmitter and a receiver. The former contains the infrared source and optics to collect the radiation and project it outwards as a collimated beam. The latter monitors the intensity of the beam at two wavelengths. Hydrocarbon gases, such as methane and propane, absorb light at one of these wavelengths but not at the other, so the ratio of the two signals can be used to detect the presence of these gases.

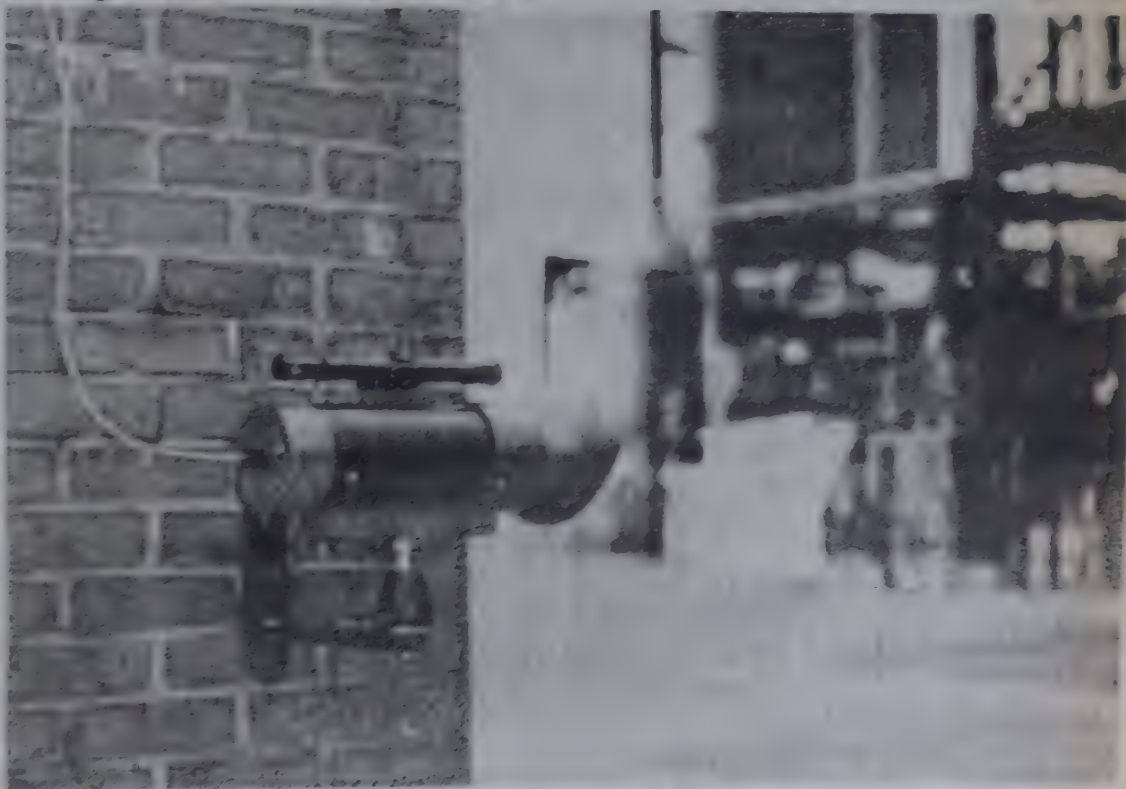
The signal processing is carried out by a microprocessor incorporated into the receiver unit. The microprocessor performs the ratio calculations and determines whether gas is present, carrying out various self-checks. Because the signals from both wavelengths are attenuated equally, their ratio remains constant and neither bad weather nor dirty windows will cause difficulty.

Moreover, the microprocessor can distinguish between the presence of

gas and a solid object obstructing the beam. A short interruption, such as someone walking through the beam, is ignored and the microprocessor resumes normal operation once the obstruction is removed. If the break lasts longer, the microprocessor will signal a fault condition.

The instrument has nearly the same sensitivity to explosive mixtures of all hydrocarbon gases and vapours. It can be used in the natural gas, mining and water industries where methane is the main hazard, and in petrochemical plants where heavier hydrocarbons may pose a threat. It is also fail-safe and will not give a misleading zero if dangerous levels of gas are present, in contrast to a catalytic detector type which may not indicate gas at all if it has been badly poisoned.

Two versions have been developed. The first is designed for use on offshore platforms and in places where relatively short path length up



Receiver unit of the long range version of the Thornton infrared laser gas detector

to 30 metres is required. The transmitter and receiver sections are mounted together in the same housing and used in conjunction with a special reflector panel.

This is made up of an array of corner cube reflectors which ensures that the beam is always returned exactly to the receiver, even if flexing of the platform or vibration causes the reflector to move slightly. One of these detectors is being installed for trials on a platform in Shell and Esso's Brent field in the North Sea.

In the second version, the transmitter is separate from the receiver. Several receivers can be used in conjunction with each transmitter, to keep installation costs low. Designed for petrochemical plants, where longer path lengths are necessary, each receiver may be up to 200 metres from the transmitter. Field trials of this version at Shell UK Exploration and Production's natural

gas liquids processing plant at Mossmorran, in Fife, Scotland, have shown not a single break in operation over a typical six months winter period, spanning a complete process module -- a distance of 92 metres.

For further details, contact Sieger Ltd., 31, Nuffield Estate, Poole, Dorset, United Kingdom.

INORGANIC MEMBRANE FILTER TECHNOLOGY

Anotec Separations Ltd. is a subsidiary of British Alcan Aluminium PLC, established to exploit its inorganic membrane technology. Building on 20 years of Alcan development, these membranes are a major advance in separation technology.

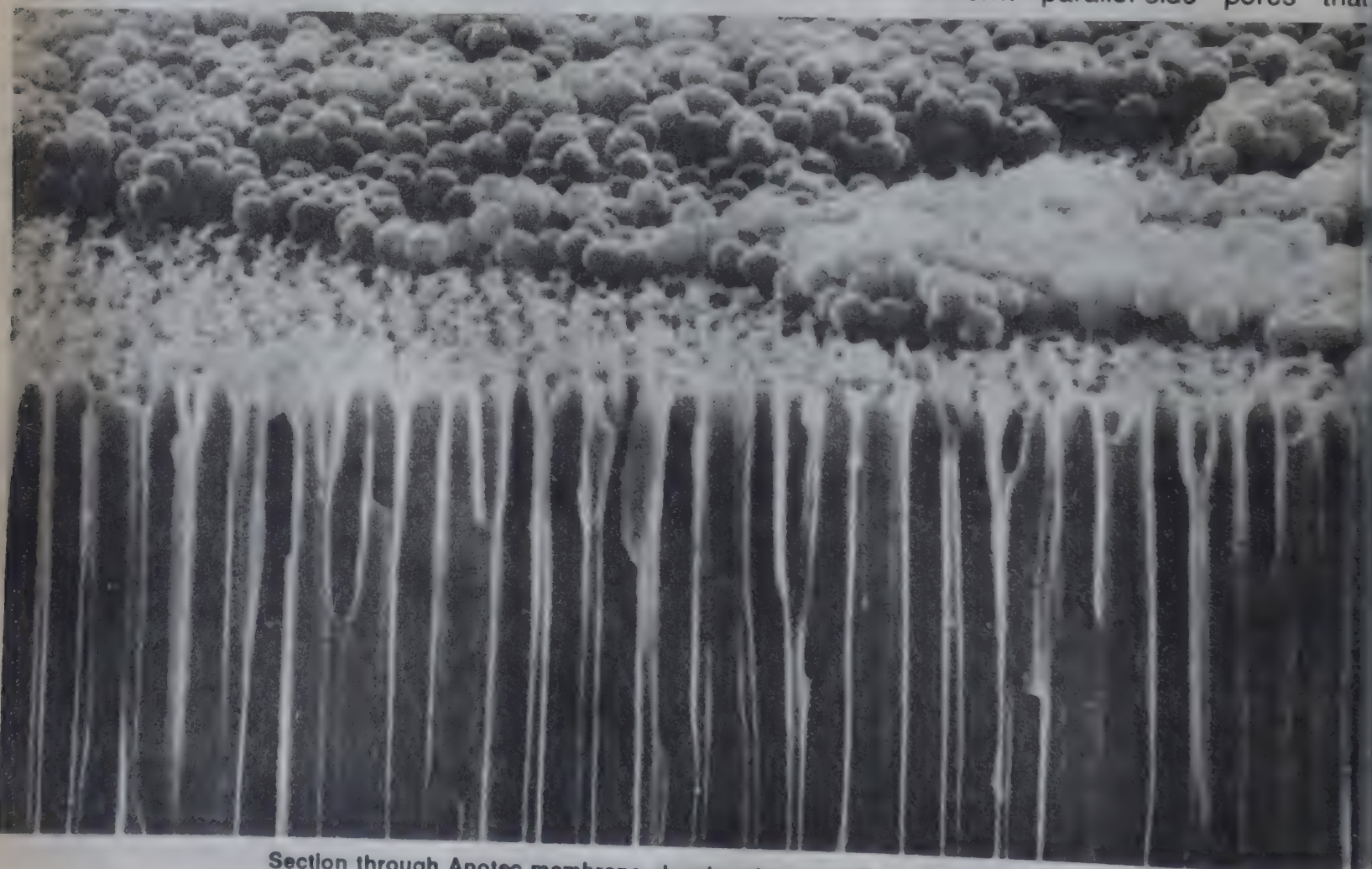
Thin inorganic membranes are produced by a patented anodising process, and are found to meet emerging separation needs in the

biotechnology, pharmaceutical health care and electronic manufacturing industries.

Possibilities of the new technology already include ultrapure water production, downstream processing affinity membranes, immobilised liquid membranes, tissue culture and monoclonal antibody production.

The anodic film produced during the anodising process grows in a precisely controllable manner to produce an extremely regular honeycomb-like structure and is released from its substrate using a novel and highly reproducible etching structure. By modifying the anodising conditions a range of pore sizes can be selected and this range is extended further by manipulation of the etching process.

Two distinct structures, symmetrical and asymmetrical, can be produced. The former consists of uniform parallel-side pores that



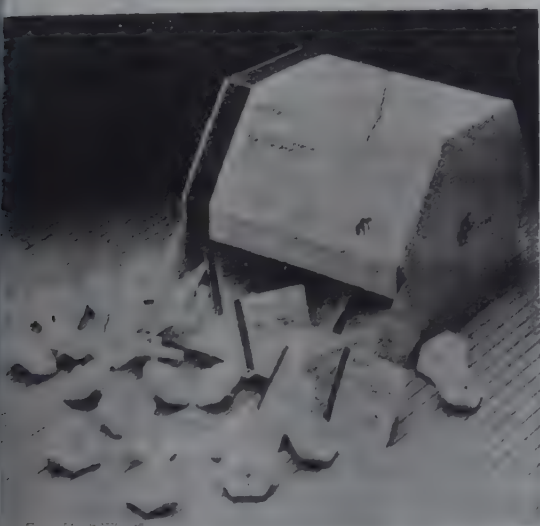
Section through Anotec membrane showing the exact filtration available

which uninterrupted from one side of the membrane to the other. The filter is characterised by uniform capillary pores that stretch across the membrane at right angles to its surface, but towards the upper surface the pores taper to form a much finer sieve.

A third type of structure can be formed by laying another thin film above and on the surface of the first membrane.

The wide range of pore sizes possible allows Anotec to tailor its membranes precisely to meet any need, producing them with exceptionally narrow pore size distributions, excellent flow characteristics and very wide solvent compatibility. Since the membrane is hydrophilic, it does not require the use of surfactants or other agents to achieve wetting.

It conforms to Britain's BS5736 parts 1 to 5 and the USP XXI class toxicity standards required in the United States. Very low figures are displayed for extractables and the organic compounds leached from the traditional polymeric porous membranes are not encountered. Initial products from Anotec are the Anotop syringe filters, the Anodisc membrane filter, and the Anocel.



Anotop disposable syringe filters

The syringe filters are made in two different sizes, 2 mm and 10 mm

across the hexagonal sided filter, containing 0.2 μm or 0.02 μm pore size inorganic membranes, and can be supplied in sterile or non-sterile form. Designed for high pressure liquid chromatography (HPLC) sample preparation and cold sterilisation of biological fluids, their exceptionally narrow pore size distribution of the membrane is centred precisely on its rated pore size and ensures extremely well defined retention characteristics. Particularly high flow rates are possible and their wide solvent compatibility includes nitric acid and glacial acetic acid, along with most other organic solvents.

The Anodisc 47 is a membrane disc filter reinforced at its edges and designed to retrofit to standard vacuum filtration devices. Also available in 0.2 and 0.02 μm pore sizes, they are well suited, for example, for mobile (solvent) phase filtration in HPLC systems.

The Anocell is a tissue culture plate insert, designed to fit 24-well and 6-well plates. They have been designed for the growth of anchorage dependent cells on porous supports. The high porosity of the membrane ensures maximum accessibility of culture medium to the basolateral membranes of cells growing on its surface. In addition, since the membrane is transparent when wet, growth can be observed by light microscopy.

For further details, contact Anotec Separations Ltd., Beaumont Business Centre, Beaumont Close, Banbury, Oxfordshire, United Kingdom, OX16 7RT.

HANDBOOK ON FILTRATION

The second edition of "Filters and Filtration Handbook" has been published and comprising 700 pages, it is more comprehensive than the first.

Six years have elapsed since the handbook last appeared and in that time there have been significant advances in filtration technology and product development. New materials, manufacturing methods, and applications for filters have been found and this latest technology is now permeating through to the end user.

The second edition of this handbook has taken account of these new technologies and developments to produce, in one volume, practical answers to problems of contamination in our industrial society. It is a valuable addition to the engineers' bookshelf and a good working tool.

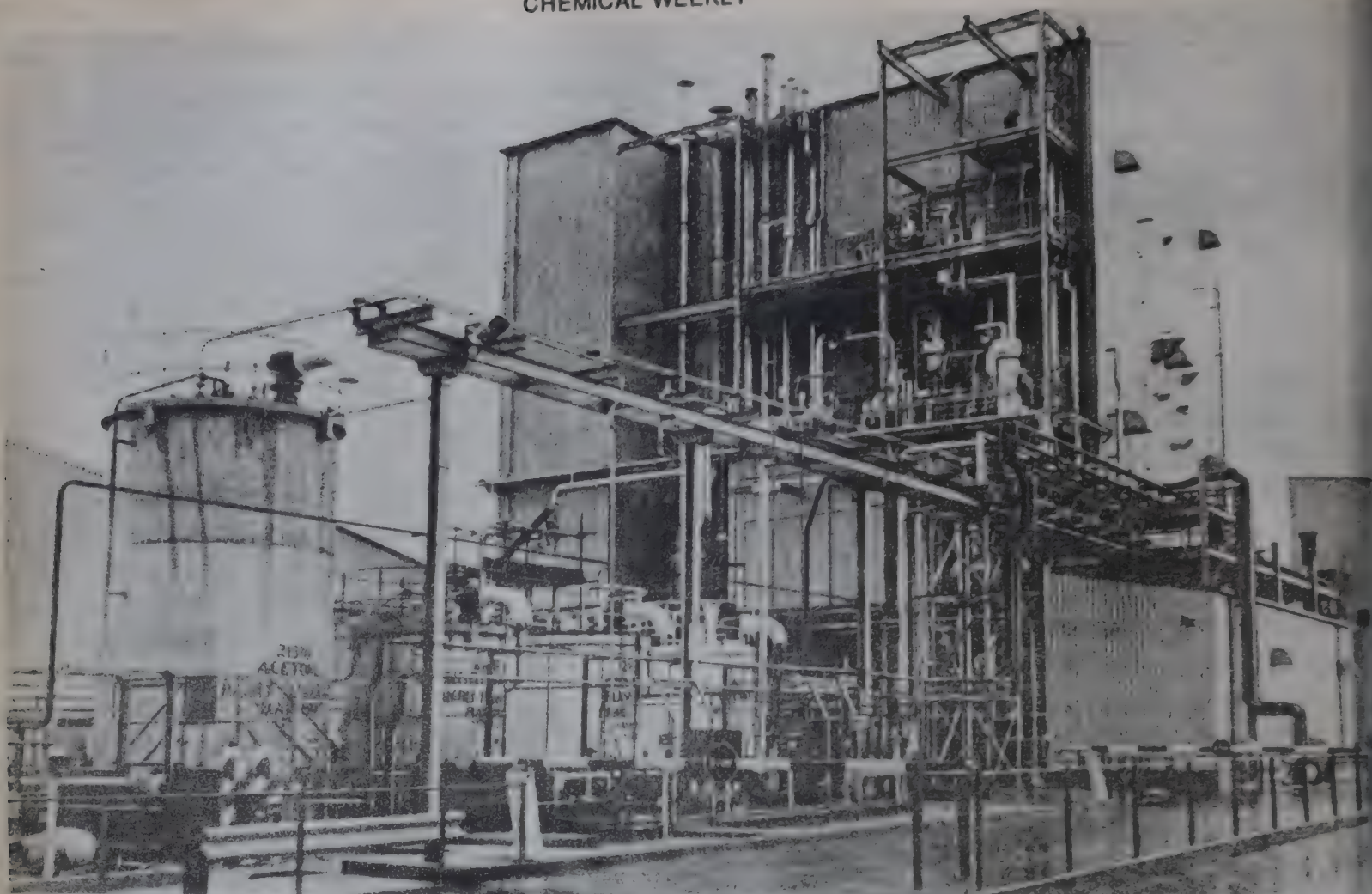
New chapters on process filtration, sterile air and gas filters, back-flush filter systems and the Pneurop European Committee's recommendations on standards, have been added. Most other chapters have been rewritten or considerably updated, in particular those on contaminants and contaminant levels, compressed air filtration, water filters, air filters, hydraulic system filters and filter selection. In eight sections, the handbook costs Pound 82 including postage.

For further details, contact: Trade and Technical Press Ltd., 13 to 15, Creek Road, East Molesey, Surrey, United Kingdom, KT8 9BE.

ICI INVESTS IN HIGH TEMPERATURE ENGINEERING POLYMERS

ICI has announced the commercial availability of a range of self-reinforcing polymers (SRP) plus a new world class polyether ether ketones (PEEK) production facility.

These and others in the Victrex range of speciality engineering polymers will be produced alongside its polyethersulphone (PES) plant at its



The new Victrex PEEK production plant recently opened by ICI Advanced Materials at its Hillhouse, Lancashire, northwest England, site. ICI was awarded the queen's Award for Technological Achievement in 1987 for PEEK.

present site in Lancashire, north west England.

The PES plant has a capacity of some 2000 tonnes per annum and the new PEEK plant base capacity of 1000 tonnes per annum, plus scope for considerable extra capacity through "debottlenecking". SRP capacity is likely to rise as demand increases.

ICI's SRPs and liquid crystal polymer (LCP) aromatic polyesters which possess a unique molecular structure that produces a unique property profile. The term "self-reinforcing polymer" describes this class of materials since many of the properties of unfilled SRPs are similar to those of fibre reinforced conventional thermoplastics.

Liquid crystal polymer molecules are rigid and rod-like, unlike the flexible molecules such as those of conventional polymers like polyethylene

terephthalate (PET). Under shear, these rod-like molecules can only stack together by forming an ordered melt, rather like logs in a mill pool, which on cooling forms an ordered solid.

Two Series

This behaviour, unique to SRPs, produces the combination of low melt viscosity under shear, low mould shrinkage, high modulus and good solvent resistance. Strong points are their chemical resistance and inherent low flammability without the aid of retardant additives. Their thermal stability is such that Victrex SRP grades have an estimated continuous service temperature in the range 160 to 220°C.

The range consists of two series, based on chemically different SRPs. The Victrex SRP1 series are general purpose grades while the Victrex SRP2 series are speciality ones off-

ering superior continuous service temperature and hydrolytic stability. Both are available as unfilled grades for injection moulding and extrusion and as 27% glass fibre filled grades for injection moulding.

The dimensional stability of LCPs permits the manufacture of high precision mouldings to tight tolerances, and typical applications include column packings, impellers and fan blades in the process industries, and components in fibre optics and electronics.

The new facility greatly extends the capacity for PEEK and PEEK/PES-made products. It will also produce PEK which, like PEEK, is a linear aromatic polyketone with even higher operating temperatures, especially with fibre reinforced grades up to several thousand hours of continuous use temperatures as high as 260°C. The plant also has facilities for other speciality

ymers. Victrex HTA is a biphenyl modified polyethersulphone which shows a significant improvement in high temperature load-bearing properties over the Victrex PES from which it is a development. Its applications include compressor components, seals, membranes, gas turbine bearing surfaces and a range of electronic and other applications such as bobbins.

A few examples of the use of PES and PEEK in fluid handling are produced by KDG Flow Meters for meter pistons, PEEK being used for particularly aggressive environments; by Dowty Mining Equipment for poppet valves; and by Saunders Valve with its new steam-sterilised Saunair EC, which achieves a reduction of over 50% in size and weight.

For further details, contact: ICI Advanced Materials Business Group, Victrex Sales Office, P.O. Box 6, Bessener Road, Wellwyn Garden City, Hertfordshire, United Kingdom, AL7 1HD.

CONDENSATE PUMP SETS SAVE ENERGY

John Millar (UK) has developed a range of condensate pump sets available as packages or as free standing units. They are designed to collect the hot condensate water from a steam heating or process system and return it to the boiler hot well to be re-used. Such a system, working at 100°C for example, can contain as much as 25% of the heat used to produce the steam.

Condensate pump sets are supplied in single or duplex designs, either as a complete works-assembled package or as a separate tank with freestanding pump(s) and control box to be positioned where convenient on site. Package sets comprise tank, framework,

pump(s), interconnecting pipework and built-in electrical control system. They need only be connected into the condensate return piping and wired up to the electrical supply. All sets are capable of handling three times the normal load to allow for intermittent operations.

Simplex sets comprise one receiver tank and one pump with automatic controls. Condensate water from the steam heating or process system flows by gravity into the receiver. When the water level in the tank rises to a certain level, the pump is switched on and the condensate is discharged to the boiler or hotwell. This lowers the water level in the receiver until the low level is reached when the pump is switched off again. This set is suitable for small schemes.

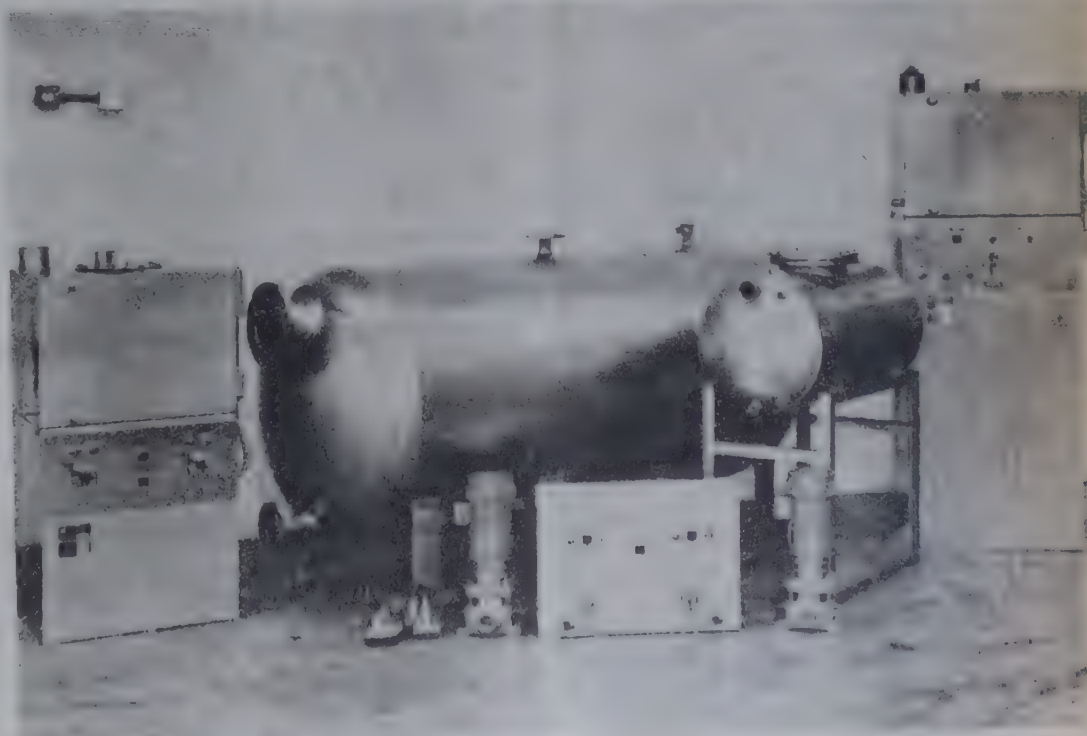
There are two Duplex sets, one with simple changeover and the other with cascade operation. The set with simple changeover comprises one receiver and two pumps, allowing one pump to function as a duty pump and the other as standby. This arrangement is useful where large quantities of condensate are

being handled and where failure of the unit would cause serious energy losses and inconvenience. Units can be provided with manual or automatic changeover to allow for maintenance or pump failure.

Duplex sets with cascade operation also consist of one receiver with two pumps and automatic changeover. But here, if condensate levels rise above normal high levels, standby pumps automatically start up and quickly handle the extra loads. When condensate levels drop to the lower mark, normal single pump operations resume. In the event of failure the standby pumps take over automatically. The cascade system enables smaller and therefore less expensive pumps to be used.

Both package and freestanding sets are available in a wide range of sizes and variants from 907 kg to 18,140 kg/h normal load.

For further details, contact: John Millar (UK) Ltd., Rallim House, Carham Road, Carr Lane, Industrial Estate, Hoylake, Wirral, Merseyside, United Kingdom, L47 4BB.



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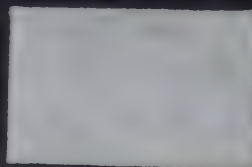
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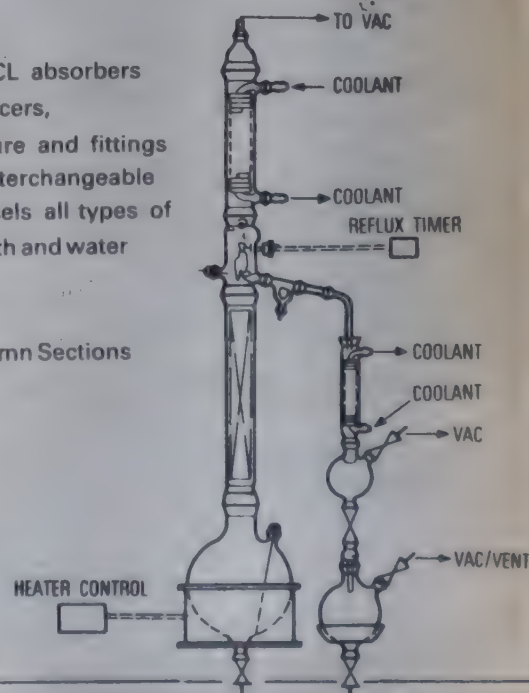
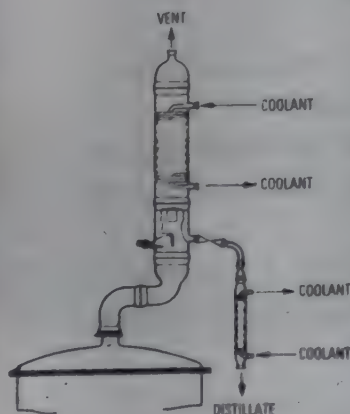
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Chemical News from Abroad

SANOFI OUTLINES PLANS FOR INTERNATIONAL GROWTH

Sanofi, the drugs and consumer products arm of France's Elf Aquitaine, has announced some new ventures which will increase its operations in Spain, West Germany, Mexico and China.

In Spain, Sanofi and Agropecuarias, a major poultry breeder, have set up a joint venture called Sonagro which will develop and sell products to the veterinary and agriculture markets. The company, of which Sanofi owns 50 per cent, becomes operational on January 1, 1988.

Sanofi also says it is about to conclude the acquisition of a West German group which specializes in veterinary products. The Elf Aquitaine unit says the acquisition will double its sales in the West German market to over DM8m/year.

In China, Sanofi is to build a plant to manufacture vaccines for poultry. The equipment is being supplied by US group Kansas City and will cost between FF15-17m. This deal will be finalized by March next year.

Sanofi vice-president Jean-Francois Dehecq says the company has plans for two other projects in China. One involves the cultivation of roses for aroma production and should be concluded next spring. The other involves the construction of a cosmetics plant, but details have not yet been agreed.

In Mexico, meanwhile, Sanofi has just inaugurated \$2m expansion project at its plant near Mexico City. A new sterile unit has been built for the production of injectable products and eye care preparations.

According to the French

group, it intends to diversify its production in Mexico and will use its base there to penetrate the markets of Central America and the Caribbean. Sanofi's sales in Mexico are around \$11m/year, of which \$6.5m are pharmaceuticals.

The company is also considering a project based in Mexico, which involves carnation cultivation for the export market. Sanofi acquired a French carnation breeder, Berberet et Blanc, earlier this year.

SMITHKLINE BUYS SPANISH FIRM

US Drugs manufacturer SmithKline Beckman has moved into the top 15 Spanish pharmaceutical companies with the acquisition of Madrid-based Morrieth SA.

The Spanish group has sales of around \$15m, employs 249 people and has 26 products in a variety of therapeutic categories. According to SmithKline, Morrieth is fully integrated with manufacturing, marketing, sales and R & D.

Morrieth's major products include the ethical drugs Elixifilin, a bronchodilator and mucolytic expectorant, Sereprostat, for treating diverse prostatic conditions, and Diertine, a vasodilator. The company also has a number of new products, some developed in-house and others licensed, which are waiting for registration.

A spokesman for SmithKline said the company was a very good fit with the US group's existing business and provides the company with an expansion opportunity in the world's seventh largest drugs market.

Total sales for SmithKline were around \$3.7bn in 1986 and this figure is likely to top \$4bn

for 1987. Overseas sales account for one-third of total turnover.

DSM TO ACQUIRE FREEMAN

Dutch Chemical group DSM is negotiating the acquisition of UK-based Freeman Chemicals from H. H. Robertsen. The deal fits with the strategy of DSM's resins division which is planning to boost sales from Dfl. 1.1bn in 1986 to Dfl. 2bn by 1992 through acquisitions and increasing capacity at existing plant. DSM has already purchased Savid and the production of ICI Atlas, both with facilities in Italy.

Headquartered in Ellesmere Port, Freeman produces resins and sheet and bulk moulding compounds at a number of sites around the UK including Eastwood and Deeside. The company's turnover for the year ended December 1, 1987 was £24m.

Negotiations between DSM and Robertsen are aimed at signing of a letter of intent prior to formalizing a takeover agreement. Freeman will strengthen DSM's position in the UK, where it has no production facilities at present, rather than extend its product range.

EXXON IN JAPAN JOINT VENTURE

Exxon Chemical Co. has set up an adhesives joint venture in Japan with Tonen Sekiyukagaku (TSK). The new company, Tonex, will be owned 50-50 by the parents and will manufacture and sell tackifying resins. It will become operational in March 1988.

Until this new deal, TSK manufactured Exxon's Escorez resins at a 15,000 ton/year unit at Kawasaki while Exxon was responsible for marketing.

According to Exxon, the joint venture plans to construct a 7,000 ton/year plant to manufac-

ture speciality water white resins based on the US group's proprietary technology. These are used in hot melt and pressure sensitive adhesives. The plant is due on stream in 1989.

Exxon is the world's biggest water white resins producer and has plants at Notre-Dame-de-Gravenchon in France and Baton Rouge in the US.

DUTCH CFC AGREEMENT

An agreement between the Dutch environment ministry and the aerosol manufacturers association Nederlandse Aerosol Vereniging (NAV) will reduce chlorofluorocarbons (CFCs) used in aerosol manufacture by a total of 80-85 per cent by 1990.

Aerosols produced for the Dutch market will see CFC levels cut by 90-95 per cent, but export products are being allowed a higher threshold. The agreement does not affect aerosols for medicinal applications.

The ministry says the deal is in line with controls agreed under a united nations protocol to reduce global CFC use by 20 per cent by 1994.

ICI SELLS UNIT FOR £10M

ICI has sold its Visqueen polyethylene film subsidiary to the packaging products and fabrics manufacturer Scott and Robertson, for around £10m (\$18m). Visqueen was the first UK producer of polyethylene film — but since ICI's withdrawal from UK polyethylene manufacture in 1982, the business has lost its strategic importance. Turnover is around £35m.

With four UK operations, Scott and Robertson regards polyethylene film as a core activity and will provide consis-

tent levels of investment at Visqueen.

Separately, ICI is to sell its UK gasoline retail business to Burmah for £21m.

HEYMAN IN NEW BID FOR GAF

Sam Heyman has made a new offer to acquire GAF Corp, the building products and chemicals group of which he is chairman, for \$1.34bn. Back in September, Heyman had offered to buy GAF for \$2.3bn but he withdrew this on October 9, the day of the stock market crash.

According to the GAF chairman, a management group will buy the company if it gets the backing of independent directors and shareholders.

REPORT ATTACKS HIGH COST OF FRENCH ENERGY SUPPLIES

A new report from the French government's general planning commission says the French chemical industry pays FF500m/year (\$90m) more for electricity than its European competitors. Significantly, it also points out that no new chloralkali capacity has been added in France over the past decade while countries with cheaper electricity such as Norway, Sweden, Finland, Denmark, Austria and Italy have seen new plants and expansions. The trade balance for chlorine and halogenated derivatives has swung from a FF285m surplus in 1985 to a deficit of FF390m in 1986.

The French chemical industry fares no better on gas costs. Unlike other European producers, it pays a tax on gas used as fuel. The fertilizer industry also pays higher charges on natural gas feedstocks, although this gap has

narrowed. There is also a large tax on heavy fuel oils.

The report says that France's chemical industry consumes 45 per cent of natural gas used by industry as a whole; 54 per cent of liquid hydrocarbons; and 21 per cent of electricity. It also points out that the total costs to the French chemicals industry of these and other energy sources and feed-stocks is FF21.5bn, on average FF1bn higher than European competitors.

Meanwhile, Belgium's Solvay is negotiating an agreement with Electricite de France (EdF) which could cut electricity costs for the chemicals group's French operations. Solvay is expected to adjust its chloralkali operations to coincide with periods of low demand on the electricity grid. The deal is expected to be renewable on an annual basis.

Earlier this year, Atochem agreed a similar deal to run until 1995. The French chemicals company has agreed to stop chlorine production 440 hours/year to coincide with periods of high demand. This will cut EdF's generating costs and part of the saving will be passed on to Atochem.

Solvay declined to elaborate on its prospective deal as negotiations with EdF are still in progress.

French chlorine and phosphate producers — large consumers of electricity — have long complained they do not benefit from France's nuclear energy programme and face higher cost than competitors. This combined with generally higher energy cost in France, makes them less competitive than producers based in other countries.

CARBIDE OPPOSES BHPAL MOVE

Indian district court Judge, M. Deo ordered Carbide to pay interim relief to the Bhopal gas leak victims amounting to Rupee 5bn (\$250m) or 9 per cent of the total \$bn claim.

Two groups, the Poison gas episode struggle front and the People's health clinic, urged Judge Deo to grant the equivalent of \$770.4m compensation for the victims while settlement negotiations continued.

Prior to the order, Carbide said: "Although we are deeply concerned for the victims, Union Carbide Corporation opposes such demands for interim compensation because it would amount to awarding damages without a trial, a practice that is counter to the laws of India and other democracies. Settlement, not circumventing the law, is still the quickest way to get needed money for the victims."

The Indian government supports proposals for interim relief because it says that many of the victims may die before the case is settled.

SPAIN PRESSES ERT AND CROS FOR FERTILIZER DEAL

The Spanish industry ministry is trying to push ERT and Cros into a final agreement on the merger of their fertilizer businesses and has set a December 20 deadline for a deal. In the event of no deal being reached, the government says it will examine other ways of reorganizing Spain's privately-owned fertilizer sector. A ministry spokesman denied the deadline was an ultimatum but said the government is anxious that a deal be concluded by year end.

Sources indicate that the two companies are very close to a deal but Cros is apparently insisting that ERT includes some non-Spanish assets in the new venture. It is over a year since ERT and Cros agreed in principle to merge their fertilizer operations under the umbrella of an existing joint venture, Fosforico Espanol (Fesa).

OXY IN BRAZILIAN JOINT VENTURE

The Brazilian subsidiary of Occidental Chemical and its local subsidiary, Vulcan, have formed a joint venture with Sao Paulo firm Unipar for the manufacture and sale of phthalic anhydride, plasticizers, fumaric acid and, in future, maleic anhydride.

To be known as Ftaliquimica, the company will comprise the

existing chemical division of Vulcan and, according to Morris Kantor, managing director of the new company, will be the largest producer of phthalic anhydride in Latin America. Capacity is 48,000 ton/year, and will increase to 61,000 ton/year through debottlenecking. Plasticiser capacity amounts to 50,000 ton/year.

Orthoxylene feedstock for phthalic anhydride comes from Petroquimica Unaio's Paulo refinery. All output is under long-term contract to Ftaliquimica. Some naphthalene feedstock is derived from local steel mills.

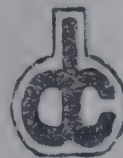
A new plant under construction will produce 3,000 ton/year of maleic anhydride using Denka catalysts and butane feedstock, probably from Petrobras.

Small quantities of this output are slated for export to the US, China and the Far East.

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The deal has been complicated by the intervention of the Kuwait Investment Office (KIO) which has built up sizeable stakes in both companies. Currently, ERT president Jose Maria Escondrillas is trying to persuade the KIO to sell its 15 per cent holding back to the company or exchange it for a stake in the fertilizer joint venture.

The KIO, meanwhile, had threatened to make a tender offer aimed at acquiring majority control of ERT. Now, however, it seems the Kuwaiti organization may be prepared to wait until ERT's annual general meeting in May when it will seek to force some changes on the company's board.

ATANOR EXPANDS H_2O_2 CAPACITY

Atanor, one of the partly government, partly private Argentinian chemical companies up for full privatization, is expanding hydrogen peroxide capacity by 5,000 ton/year. A new plant, currently in the engineering stage, will be built alongside the company's existing 4,000 ton/year unit in Rio Tercero, Cordoba.

The investment cost for the project will be around \$20m. The unit, which will use Degussa technology — as employed by the company in its existing plant — will be built by a local engineering company.

The new product is aimed principally at the local market, although some 10-15 per cent of the 100 per cent pure product will be for export. The company is steadily increasing exports, says managing director Jorge Gaibisso.

Atanor manufactures a wide range of chemicals at three locations in Argentina. Its Munro site, 22km from Buenos Aires makes acetaldehyde, acetic acid, ethyl butyl and isobutyl acetates,

formaldehyde, phenolic resins, agrochemical formulations and other products totalling some 35,000 ton/year.

At Baradero, 150km from Buenos Aires, the company produces a similar product slate, including sorbitol to a total capacity of 15,000 ton/year, while at Rio Tercero chloralkali, methanol, hydrogen peroxide and other products total 80,000 ton/year capacity.

At a distillery in Mendzao, 400,000 litres/month of ethyl alcohol are produced and supplemented by local distillation-to-order contracts.

REPSOL SEALS CARBIDE DEAL

Repsol Quimica, the Spanish state-owned petrochemicals company, has received government authorization for the purchase of Carbesa, the carbon black business currently owned by Cepsa. The total cost of the acquisition is Pta575m (\$5m).

The deal cements Repsol's position as the leading Spanish carbon black producer and boosts capacity to over 60,000 ton/year. Repsol will now control around 46 per cent of the Spanish market with a good geographical spread throughout the country. Carbesa will also broaden the range of grades Repsol can now produce.

GARDINI REPEATS ENICHEM OFFER

Montedison's new chairman Raul Gardini has repeated an offer to acquire Italy's state-owned chemicals group, Enichem. Speaking to the budget committee of the Italian parliament, Gardini also said other possibilities for linking the two chemicals groups will be considered.

But he stated his personal opposition to joint ventures and said that any agreement other than an acquisition would have

to give Montedison the lead role in a link with Enichem. Gardini argued that Montedison has stronger management and that Enichem is "structurally fragile."

The Montedison chairman said that his company remains committed to expansion and would prefer to grow in Italy. But if opportunities are not forthcoming Montedison will look for other European partners.

BORDEN DIVESTS COMMODITY BUSINESS

US food-to-chemicals group Borden Inc. has divested a major part of its commodity chemicals business through the flotation of a 64 per cent stake in its Geismar, Louisiana petrochemicals complex and its PVC resins plant at Illiapolis, Illinois.

A further 11 per cent was placed on the stock market taking the divestment up to 75 per cent.

A company spokesman said Borden would retain the remaining 25 per cent through a subsidiary "for at least 10 years". The company is not selling its speciality chemicals business.

According to the spokesman, the issue was the "biggest and most successful" public offering on the US stock market since the October crash.

The initial placement had netted the company \$373m. "It went so well that we moved up the timetable to sell the rest", he said. Borden expects to get around \$40m from the second stage of the sell off.

Total chemicals turnover 29 per cent of Borden sales, reached \$1.44bn in 1986 with operating income of \$137.1m.

Sales of speciality chemicals are predicted to top \$1bn in 1987 and fall into four main areas: forest product resins; foundry resins, plastic films and special industrial adhesives.

Chemical Markets Abroad

OPPORTUNITY FOR AROMATICS OUTPUT IN LATIN AMERICA

Most petrochemical project planning in Latin America has so far concentrated on the development of methanol and ammonia, as well as on ethylene-based complexes. But as demand growth has continued for key aromatic derivatives such as styrene, caprolactam and terephthalic acid, demand has had to be satisfied by importing intermediates or final products.

Speaking at a symposium in Rio de Janeiro after the recent Association of petrochemical producers in Latin America (Apla) meeting, Carl Steinbaum of ChemSystems said that continuing demand growth and refocusing of investment programmes will provide opportunities for the manufacture of aromatics and aromatic derivatives in the region.

Global demand for styrene is projected to increase from 10.8m. ton to 16.1m ton between 1986 and 2000, representing an average annual growth rate of some 2.9 per cent. Polystyrene accounts for around 60 per cent of monomer demand and will contribute to most of the growth in consumption, said Steinbaum.

World styrene capacity is currently around 12.3m ton, and with global demand currently running at 11.1m ton/year average plant utilization is 90 per cent of nameplate capacity. According to Steinbaum, this level would appear to be the practical production limit and as a result the styrene market has been extremely tight this year. Plant turnaround has aggravated the situation causing significant price

hikes and cash margins have increased dramatically.

Steinbaum reckons that the styrene market is likely to remain tight for the next few years, with little new capacity scheduled to be added. But by 1990, some new capacity is due on stream which will help alleviate the shortage.

In Latin America, styrene demand was 423,000 ton in 1986 and it is projected to reach 785,000 ton by the year 2000, representing an annual growth rate of 4.5 per cent. The consultant notes that this level of growth is significantly higher than that for the rest of the world, reflecting continued strong growth in polystyrene and ABS (acrylonitrile-butadiene-styrene) in the

region. In addition, there are substantial imports of styrene resins.

Capacity in the region is currently 530,000 ton and it is estimated that 361,000 ton were produced in 1986. The styrene plant in Mexico has not run at capacity for some time due to lack of feedstock and operating problems. Around 62,000 ton of styrene was imported last year. A 70,000 ton/year plant is under construction in Brazil, and when this is completed in 1990 and the Mexican plant is operating at a higher level, Steinbaum notes that the regional deficit will be substantially reduced.

Subsequently, additional capacity will be needed. Venezuela is studying a future styrene project now and styrene and styrene resin projects are proposed.

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As far as benzene is concerned, worldwide demand is expected to increase from 17.9m ton in 1986 to 24.9m ton in 2000, an annual growth rate of 2.4 per cent. According to Steinbaum, there is currently ample global capacity for benzene, particularly as toluene hydrodealkylation can be used to fill any gaps between supply and demand.

Steinbaum expects the market to tighten as demand is growing at 2.4 per cent/year and the availability of reformate, the major supply source, should not grow nearly as fast. Increasing amounts of toluene HDA will be needed and eventually existing HDA capacity will not be enough to bridge the supply/demand gap.

Latin American benzene consumption is projected to increase from 745,000 ton in 1986 to 1.2m ton by 2000, an average

annual growth rate of 3.6 per cent. Brazil and Argentina are net exporters of benzene, while Mexico is an approximate balance. Steinbaum notes that this is unlikely to change significantly.

New ethylene capacity based on heavier feedstocks and additional refinery product is expected to provide sufficient benzene to meet most demand.

The styrene projects which are being planned for the early 1980s are required to meet regional product requirements, said Steinbaum. In addition, styrene export opportunities will exist as an output for surplus production due to the absence of project development in many regions. But the ChemSystems' executive says plants will need to be competitive with those in North America.

Steinbaum foresees that Latin American companies will have to determine their international competitiveness and ability to utilize exports of styrene to generate foreign earnings. The analyst adds that comparable statements could be applied to benzene production.

The availability of low valued LPG streams may offer an opportunity for benzene production by newer technology and disengage aromatic derivatives production from the availability of refinery streams or the use of heavy liquid for ethylene production.

HOECHST SHELVES VAM START UP PLANS

Hoechst is understood to have abandoned plans to restart its mothballed vinyl acetate plant (VAM) in Tarragona, Spain. The plant, which has a capacity of 75,000 ton/year — more than current Spanish consumption — ceased production in 1979.

A spokesman at Hoechst said the company had been considering the start-up for some time because of the shortage of VAM in Europe at the moment, although he stressed that it had no connection with the recent explosion at the Hoechst-Celanese acetic acid unit at Pampa in Texas which supplied much of the company's VAM feedstock.

Strong demand and tight supply is expected to push VAM prices in Europe in January to between DM1,650-1,670/ton, up 10 per cent from early December levels which were around DM 1,500-1,550/ton. While market sources indicated that a start-up would help relieve shortages in Europe, the source of feedstock acetic acid remained unclear, as several Spanish acetic plants have been closed.



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Plastic Markets Abroad

MIXED OUTLOOK FOR PLASTICS AT YEAR END

Plastics producers are experiencing mixed fortunes in Europe at the moment. In the buoyant polyolefins market, polyethylene and polypropylene producers are enjoying healthy margins as demand races ahead but supply remains tight. Sellers are finding it easy to push through regular price rises, particularly in the case of PE, where customers are heavily allocated and spot material is extremely scarce.

The PVC market by comparison is quiet. Demand is steady and prices have remained stable during the past month. Polystyrene, meanwhile, continues to be the black sheep of the plastics family. The demand outlook is lacklustre and prices have drifted down, paring margins and leaving barely enough to cover the cost of feedstock styrene.

The PE market has aroused most interest this month. Supply has grown critically tight, many customers have been put on severe allocations and prompt spot material is virtually unavailable. Now that Europe's cracker problems have been solved, ethylene supply has eased and all PE facilities are reported to be running "flat out."

With demand still forging ahead, producers have found it easy to push through price rises of 5-10 pfennig/kg on most grades. Low density film is currently moving at around DM1.75-1.82/kg with linear low film slightly ahead at DM1.80-1.85/kg. High density film is fetching a little more at DM1.85-1.90/kg. Similar rises have been achieved for blow moulding and injection grades of hdPE which are both moving at DM1.70-1.80/kg. With demand not expected to slacken

in the foreseeable future, producers are seeking to hike levels by a further 5-10 pfennig/kg in the new year.

Despite customers' unease about soaring PE prices and the large cash margins being enjoyed by producers, price increases are unlikely to be held back while producers hold the upper hand. Scarcity of "black market" in the UK in particular with spot product talked at prices as high as £770/ton — way above contract.

Spot business is now being carried out above DM1.85/kg on the continent with prices of well over DM2.00/kg. being paid for smaller lots. The sky is the limit for spot sales at the moment, some say, and the market is awash with rumours of producers selling customers short to divest product for spot sales and consumers selling off excess product

into the spot market. There are also rumours of low quality off-spec material fetching similarly inflated prices as converters scramble to keep plants running.

The polypropylene market is a little easier this month, with prices beginning to level off and some improved availability. However, the market remains finely balanced and although customers have not yet been put on allocation, producers warn that they could have difficulty in meeting extra enquiries if demand increases significantly or there are any major supply interruptions.

Prices have remained reasonably steady, with the bottom end of price ranges firming very slightly. Raffia and injection moulding grades are now at DM1.80-1.90/kg and DM1.90-2.05/kg respectively. Strong demand for the homopolymer products have continued to erode the price differential between homopolymer

PLASTICS PRICE REPORT (DM/KG)

Product	October/ November	Market Price December
High density polyethylene (hdPE)		
Injection moulding	1.65-1.70	1.70-1.80
Film (extrusion) grade	1.75-1.85	1.85-1.90
Blow moulding	1.65-1.70	1.70-1.80
Linear low density polyethylene (lldPE)		
Film grade (butene-based)	1.70-1.80	1.80-1.85
Low density polyethylene (ldPE)		
Film grade	1.65-1.75	1.75-1.82
Polypropylene (PP)		
Raffia grade	1.80-1.85	1.80-1.90
Injection moulding	1.85-2.00	1.90-2.05
Copolymer	2.00-2.30	2.00-2.30
Polystyrene (PS)		
Crystal	2.40-2.45	2.35-2.45
High impact	2.56-2.65	2.47-2.56
Polyvinyl chloride (PVC)		
Pipe grade	1.53-1.60	1.55-1.60
Paste grade	2.10-2.35	2.20-2.35

The left hand column gives a guide to price levels for large-to-medium size buyers and for general-purpose grades in October and November. The right hand column shows the latest prices in December.

and copolymer material, which is still stuck at DM2.00-2.30/kg.

Producers are reporting a slight seasonal dip in PP demand, typical of the traditionally quiet December period, but affirm that underlying growth is still strong. With annual PP growth, some believe, now "in the low teens" producers expect to be hoisting price levels up by a further 5-10 pfennig/kg in the new year, leaving buyers with little option but to pay up.

With the tightness evident in the PP business, spot availability in Rotterdam is short, but business is currently quiet. Limited supplies are available for export with numbers at around \$1 250-1 280/ton fob being typical. This translates to \$1 320-1 350/ton cif Far East. As EEC duties continue to keep imports away, only very small volumes of speciality grade material are reaching European shores.

But despite the seasonal lull in PP activity, producers and traders alike are confident of an upswing in the early part of next year. With demand expected to remain buoyant, better export sales and domestic demand will send prices up again, particularly as a number of plants are scheduled for maintenance turn-arounds and no new capacity is due on stream until the latter part of the year.

After dipping slightly last month polystyrene prices have stabilized a little but, relative to other plastics, still show no immediate signs of improving.

European PS sales have been growing at 14 per cent/year on year but with the recent increase in feedstock costs, market sources are suggesting that levels have fallen to 9 per cent. All styrenics producers have been hit

by the soaring price of monomer, which at the end of November reached its highest level this year of \$1,300/ton fob for T2 material on the Rotterdam spot market. Even though prices have eased back to \$1,270-1,290/ton now, most producers report profit margins are still "virtually nil". "The difference between the selling price of PS and the buying price of styrene monomer is just covering our packaging costs," said one producer. Most producers, however, are making good profits in the integrated business.

Producers have also taken heart from a sudden upturn in business this month, particularly for high impact grades. But while one UK producer said his business was booming, others in Western Europe preferred to describe the market as "snug" and were reasonably optimistic that prices had to improve in the new year.

Crystal grade prices have fallen at the bottom end to DM2.35-2.45/kg with high impact dropping more sharply to DM2.47-2.56/kg. However, recent improvements in this grade are unlikely to affect the market until January. A 30 centimes increase is expected in France next year, but UK and most European producers are waiting until Q1 styrene prices are fixed before settling their increase.

PVC prices have remained steady this month with pipe and paste grades holding at DM1.55-1.60/kg and DM2.20-2.35/kg, respectively. Producers report that demand has been ahead of supply for the first two weeks of December but there are signs of slackening just before Christmas. Many are breathing a sigh of re-

lief that this lull will take the pressure off stock levels, currently at their lowest this year. PVC producers estimate they need between four and five weeks' stocks to run comfortably, but many have less than a month.

Price hikes are not expected until February when European producers will be looking at 10 pfennig/kg on pipe grades and in the UK, £30/ton. EVC is reported to have had some technical problems at one of its plants, tightening supply and firming prices of higher PVC grades.

Material from the Eastern bloc into Europe has slowed in spite of the falling dollar, and some overseas markets, particularly in Africa, South America and the Far East still seem more profitable.

EXXON UPS ETHYLENE CAPACITY IN THE US

Exxon Chemical has completed major debottlenecking work at its Baytown, Texas, olefins plant boosting ethylene capacity by more than 90 000 ton/year, a 7 per cent increase in the company's US ethylene capability.

The Baytown plant now has a capacity of over 730 000 ton/year of ethylene. Following similar debottlenecking work at its olefins plant at Baton Rouge, Louisiana, last year Exxon has managed to increase its total US ethylene capacity by more than 14 per cent to 1.5m ton/year.

According to Ken Robertson, vice president, basic chemicals, the future capability of the Baytown and Baton Rouge complexes could be close to 1.8m ton/year. Although this would require some additional investment, the increase could be accomplished at "a fraction of the cost" of a grassroots plant, he said.

In the European Market

Naphtha prices have tumbled \$142-145/ton cif in a post-Opec bear market, and in line with crude, which fell by almost \$2/barrel.

Olefin business remains quiet with all crackers running smoothly and most deals tucked away in the first two weeks of the month. The top end of the ethylene spot price range fell leaving levels at \$460-475/ton cif. While demand remains healthy, little spot product is available and most buyers are covered for the holiday period. Market sources suggest there will be no change to the Q1 ethylene contract price although no serious negotiations have begun.

The **propylene** market remains balanced but activity is quiet according to producers and traders, and prices have held at last week's levels, with DM620/ton cif West Germany being quoted as middle-of-the-market. The highlight of the week was a first quarter deal concluded at DM 620/ton between BP and BASF. This has still to be accepted by other players but with weak crude and dollar levels producers feel they will be lucky to conclude higher in January.

Butadiene demand has slowed marginally and lowered prices to \$590-610/ton. Sources suggest new contract levels could drop DM50/ton on Q4.

Trading in **benzene** has been quiet in the wake of last week's Opec meeting and prices have continued their downward trend to \$255-258/ton. Deals were completed for two 2,000 ton lots at \$257/ton fob but demand is

very slack and traders are still left with over 5,000 ton of uncommitted product at the year end.

The **toluene** market perked up briefly last week with news of a tender for 8,000 ton from Taiwan but despite negotiations with several European traders, the business eventually went to the US Gulf at \$203/ton fob. Traders were once again disappointed with limited interest and business being done in the range \$215-218/ton. Gasoline demand has failed to materialize despite tightening of MTBE supplies.

Xylenes price levels remain unchanged at \$240-245/ton for virgin material with solvent gra-

de a little higher at \$235-240/ton.

Interest in **paraxylene** picked up slightly with enquiries for product from India and the Far East. Traders offered up to \$340/ton fob which lifted spot levels to \$320-330/ton.

Orthoxylene prices dropped to be less than 2,000 ton in Rotterdam with T1 business put in the range \$1,210-1,220/ton. The market is more balanced now and sources suggest early Q1 contract negotiations are close to this quarter's level of DM2,200/ton or slightly higher.

Short **methanol** supply has pushed prices to \$177-180/ton for T2 and \$147-152/ton for T1. Producers have raised their price ideas for Q1 to DM290/ton and in the current climate this could be acceptable to all.

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News from the American Market

STYRENE PRODUCERS ANNOUNCE HIGHER PRICES

Most major styrene producers have informed customers that they will raise contract prices by 2-4 cent/lb, to 42-44 cent/lb, effective Jan. 1. The exception is Arco Chemical, which boosted its list tab by 7 cent/lb and posted a 50 cent/lb list price, minus a 3 cent/lb list price, minus a 3 cent/lb temporary voluntary allowance (TVA), effective Dec. 28. Arco's 47 cent/lb price is unlikely to stick, concedes a company insider, considering competitors' price moves. Fina Oil & Chemical will increase its styrene price by 4 cent/lb, to 44 cent/lb; Sterling will add 2 cent/lb to its current 40 cent/lb price; Borg-Warner Chemicals will list styrene at 47 cent/lb with a 3 cent/lb TVA; Chevron Chemical's list price will rise to 46 cent/lb, minus a 4 cent/lb TVA, and Huntsman Chemical will increase its styrene price by 2 cent/lb, to 45 cent/lb, minus a 3 cent/lb TVA. Before softening last summer, styrene contract prices soared from 26 cent/lb to 52 cent/lb during the first six months of 1987, while spot export prices reached close to 72 cent/lb. The export market continues to attract styrene at premium prices, producers say, with deals reportedly being done at 55-56 cent/lb. The January price hikes are, in part, intended to narrow the gap between domestic and export prices, producers say. They also are a response to rising ethylene prices and continued strong derivative demand for styrene. The last time that styrene producers increased their prices, says one marketer, ethylene was selling

for 17 cent/lb; contract ethylene is expected to be selling for 22-23 cent/lb in January.

HOECHST CELANESE TO REBUILD PAMPA PLANT

Celanese Chemical, a subsidiary of Hoechst Celanese, expects to complete full reconstruction of its chemical plant at Pampa, Tex., by late 1989. Production from the plant, which makes several organic chemicals, including more than 500 million lb/year of acetic acid, will resume by the end of 1988, however. An explosion occurred in the liquid-phase oxidation unit at Pampa on Nov. 14. Since that time, considerable attention has been given to whether Celanese would be able to reactivate acetic acid production and help relieve tight market conditions worldwide. Earlier this month Celanese said that product lines for methyl acrylate, 2-ethylhexyl acrylate, ethyl acetate and multifunctional monomers would be restarted by the end of first-quarter 1988.

VINYL ACETATE SUPPLIES ARE LIKELY TO STAY SNUG

While Celanese Chemical is working to bring its Pampa, Tex., plant back into production, the outage there has placed added pressure on other supplies of products made from acetic acid and vinyl acetate monomer (VAM). Those producers say they are being hit with higher raw material costs, particularly for VAM, and increased orders for material. As a result, several companies have announced price hikes for January. BASF Corp. Chemicals Div. will boost acrylic monomer prices by 3 cent/lb, to 57 cent/lb for technical acrylic acid, 58 cent/lb

for butyl acrylate; 56 cent/lb for ethyl acrylate, 65 cent/lb for methyl acrylate, 68 cent/lb for 2-ethylhexyl acrylate and 80 cent/lb for isobutyl acrylate. Air Products and Chemicals will hike prices for its polyvinyl alcohol products for the textile market by 5 cent/lb and increase tabs by 8 cent/lb for polyvinyl alcohol resins used in adhesives, paper and building products. On Dec. 15, Union Carbide added 2.5-3 cent/lb to tabs for its vinyl acetate homopolymer emulsions and vinyl acrylic copolymer emulsions marketed to the coatings adhesives, textile and building products industries. On Dec. 1, the Emulsion Polymers Div. of Reichhold Chemicals raised prices by 2-3 cent/wet lb for vinyl acetate homopolymers and vinyl acrylic copolymer, by 2.5-3 cent/lb for acrylic polymers and by 2 cent/lb for vinyl acetate-ethylene copolymers.

DOW RESTATES ETHYLENE OXIDE PRICE

Following other producers, Dow Chemical has restated its list prices for ethylene oxide (EO) and EO derivatives. All off-list prices for EO will be removed, and the current list price of 35 cent/lb will be re-established, Dow says. Selling prices for industrial, low-conductivity and antifreeze grades of ethylene glycol (EG) will go up by 4 cent/lb, and selling prices for all grades of diethylene glycol will rise by 5 cent/lb. List prices for fiber-grade EG will be hiked by 8 cent/lb.

New Developments from America

DIOXINS IN DIAPERS STIR SWEDEN

Sweden's Chemicals inspectorate has recommended that wood pulp bleached with sodium chlorate be prohibited from use in disposable diapers. In a letter to the ministry of environment, the inspectorate says that too much pulp is being bleached with chlorates, with the subsequent release of dioxins and other toxic substances. Some studies, the inspectorate says, reveal that dioxins can be found in disposable diaper fluff. The inspectorate says that the consumers — babies — do not care whether the diaper is white or grey, and that this makes the product suitable for a ban. The inspectorate adds that it could later consider recommending the ban to include household paper, toilet tissue and packaging paper. Although disposable diapers in Sweden are made primarily from mechanical pulp bleached with hydrogen peroxide, about 5% of the fluff used is bleached with sodium chlorate. Most of the 500 million disposable diapers sold annually in Sweden are produced locally; the Pampers brand, made by Procter & Gamble, has about 5% of the market. If the ban is adopted, it would cover imports as well as domestic products.

HOLD THE PICKLE, BUT NOT THE CANCER INHIBITOR

University of Wisconsin (Madison) researchers have isolated and identified a cancer inhibitor in fried hamburger. "We found it to be an effective inhibitor of skin cancer in mice," says Michael W. Pariza, the project leader and director of UW-Madison's Food Research Institute. The in-

hibitor, called conjugated linoleic acid (CLA), is a derivative of linoleic acid, one of the fatty acids that have been in many foods, including beef and cheese. The scientists caution that it is too early to predict what effect, if any, CLA might have on the initiation of cancer in people. "We're not suggesting that people consider hamburger an anti-cancer food," Pariza says.

ADVANCED CERAMICS MAKERS SPEND MORE ON R&D

Private U.S. research and development (R&D) expenditures in advanced ceramics reached more than \$152.9 million in 1986. That's according to a study just released by the United States Advanced Ceramics Assn. (USACA). The group also reports that the average company R&D outlay for advanced ceramics for the 23 companies surveyed was about \$6.6 million in 1986. It also notes that those companies received a total of only \$46.3 million in U.S. government R&D funding for advanced ceramics during the same period. USACA says that in 1986, private advanced ceramics R&D expenditures totalled 23% of sales; in 1987, the surveyed companies planned to boost their R&D outlays to 25% of anticipated sales.

PETROCHEMICALS IN CHINA 'MUST' DOUBLE

China's petrochemical industry must double refining capacity and output by the year 2000 to meet booming demand, according to the government.

Speaking at a meeting of China Petrochemicals Corp (Sinopec), state councillor Kang Shi'en also said the industry

must focus on improving refining and making better use of imported equipment and technology. Small and badly equipped refineries must be closed and management improved in the remaining installations, he said.

Some Yuan23bn (\$6bn) has been invested in Sinochem since 1983, according to company president Chen Jinhua. Debottlenecking and a new 300,000 ton/year plant have enabled the company to double ethylene output to 900,000 ton/year since 1985.

In Heilongjiang province, major petrochemicals developments are under way based on raw materials from China's largest oil field at Daging. Around 30,000 locally-based technicians are currently exploring new oil sources and foreign loans of \$800m have been obtained to develop six peripheral fields.

Sinopec reported profits of \$1.2bn on sales of \$11bn in 1986.

NICAS FERTILIZER PLAN

The Spanish Government is investing a total of Pta2bn (\$17.8m) in Nicas fertilisers at Valladolid, 190km north of Madrid. Although Nicas will probably end up in the planned private-sector fertiliser company Fesa, the government feels that despite the current problems facing ERT, Nicas is integrated enough to justify the investment.

Some Pta1.5bn has already been assigned to the construction of a new nitrogen fertiliser plant at Valladolid. Construction began in April of this year and is scheduled for completion in September 1988. The plant will produce 850 ton/day of ammonium nitrate and 580 ton/day of calcium ammonium nitrate. Technology is being provided by CdF Chimie.

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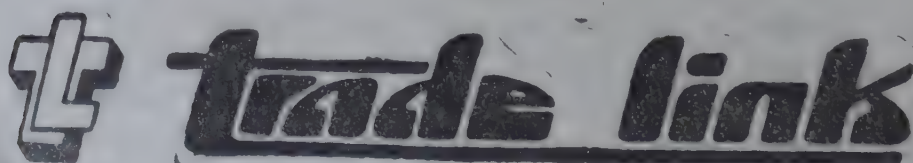
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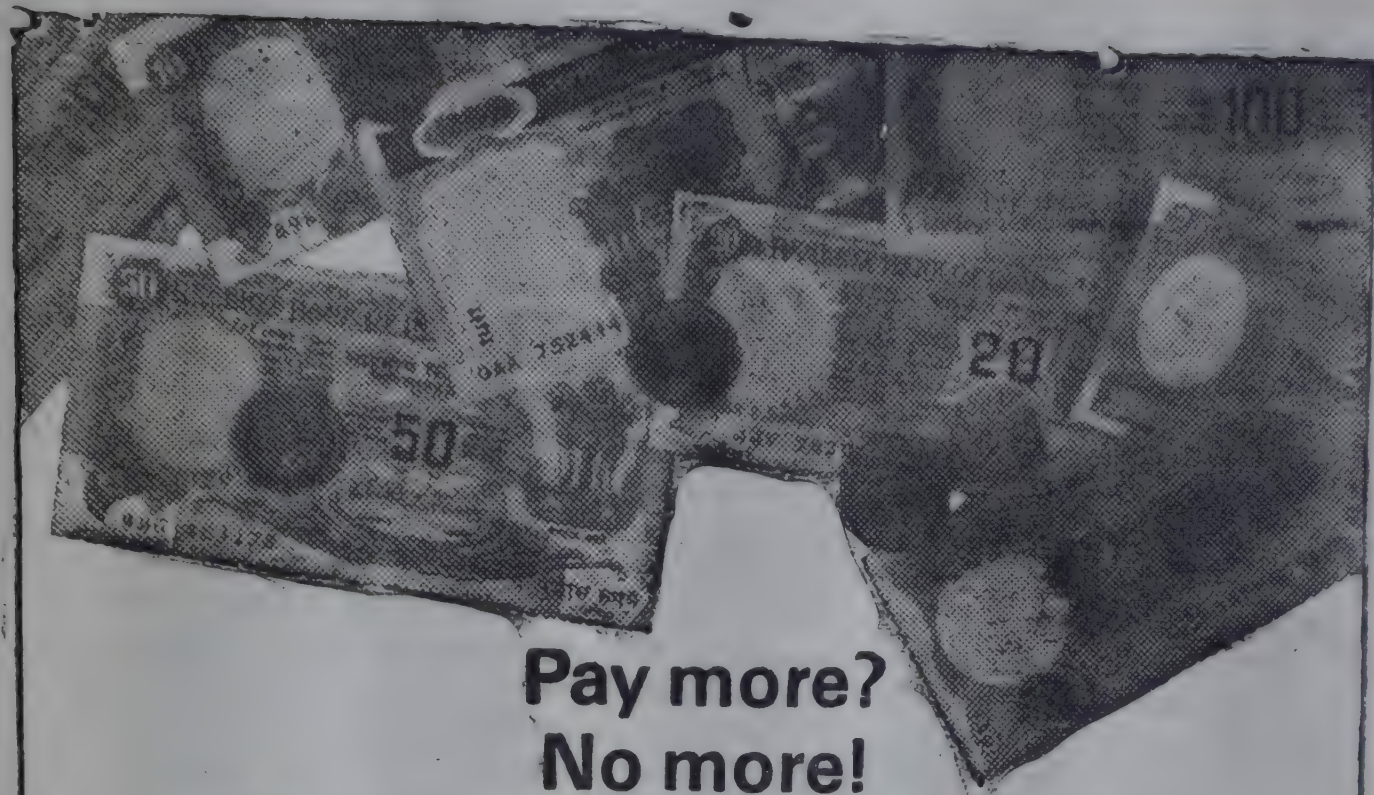
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NEWS FROM JAPAN

Boehringer Ingelheim To Set Up New Subsidiary In Japan

Boehringer Ingelheim GmbH (W. Germany) has decided to establish next January Bohringer Ingelheim Corporation, Japan (capital: Y10 billion) in Tokyo. The new Japanese subsidiary will import bulk pharmaceuticals from its West German parent company, conduct licensing operations with Japanese companies and supervise the West German company's subsidiaries located in Japan, S. Korea and China.

The above move is intended to step up pharmaceutical operations in the said three countries. San — a pharmaceutical co. — another Bohringer Ingelheim subsidiary in Japan — will prepare the bulk drugs imported by the new company. The preparations concerned will be packaged finally by Nippon Bohringer Ingelheim Co. — also a Bohringer Ingelheim group company.

To date the latter has imported preparations from the West German company but it has been found cost-competitive to import bulk drugs and prepare them in Japan.

Boehringer Ingelheim Corporation Japan is also scheduled to raise the share of imports of veterinary drugs and miscellaneous fine chemicals from the West German company.

Organic-pigment Output Rising Sharply This Year

Production of organic pigments centred around phthalocyanine-, insoluble azo, and soluble azo-based ones has been on a sharp increase, reflecting econo-

mic recovery, and is likely to hit an all-time high this year.

According to informed sources, production in the January to June 1987 period registered about 12,400 tons, an 8% rise over the same period of the preceding year, and in the later half of this year this upward trend continued unchanged.

As a result, production throughout this year is most likely to register around 25,000 tons, exceeding the previous record-high of 24,233 tons marked in 1984.

Leading pigment manufacturers such as Dainippon Ink & Che-

micals, Inc. (DIC) are showing good business performances. They intended to develop high-class pigments and branch out into overseas markets with activities which will include local production.

The sharp rise in organic pigment production stems from the increase in organic pigments for printing-ink use, reflecting the government's domestic demand promotion policy and the boom in construction as well as increased demand for foodstuffs. Furthermore organic pigments for resins centered around new kinds of construction materials and household electrical appliances have increased since early last spring, and demand for paint use is increasing.

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At present, Japan's organic-pigment manufacturers are developing high-class organic pigments, such as quinacridone- and anthraquinone-ones and high-added value organic-pigment products such as those for use in resin coloring and automobile production.

Kashima Vinyl Chloride To Build New VCM Plant

Kashima Vinyl Chloride Monomer Co. — Japan's largest vinyl-chloride-monomer (VCM) producer — has begun building new production facilities including a cracker and a refining plant. This move is intended to ensure safe plant operation. The construction work concerned will be completed next summer.

The company's existing plants have become superannuated because 17 years have passed since their start-up. The new facilities are expected to have a production capacity of 350, — 360,000 tons a year, about 30% more than that of the existing plant.

The company claims it will not expand VCM production through the on going plant construction. However, the possibility that the company may increase VCM production some time in the future cannot be completely excluded. The VCM — plant construction is certain to attract a lot of interest in industrial circles since VCM is closely connected with PVC production, which is now under the control of a specialty law — the Temporary Measures Law for Structural Adjustment of Specific Industries.

The company was jointly established in February, 1968 by five companies, including Shri Etsu Chemical and Mitsubishi Petrochemical. It originally aimed at supplying VCM having in-

ternational competitiveness to the five parent companies and has actually served as a nucleus of Mitsubishi Petrochemical's Kashima industrial complex.

Lion Akzo Builds New Amine Plant

Lion Akzo Co. has doubled the production capacity of the amine plant at its Yokkaichi factory (Mie Prefecture).

The new plant has production capacity of 8,700 t/y on the basis of such products as primary amine and mono-alkyl dimethyl amine.

Introduction of new technology has made it possible to manufacture high quality amine at low cost.

The company started constructing the plant in November 1986 at a cost of Y 2,300 million. The plant will go into operation at the beginning of next year.

The products to be manufactured will be used as raw materials for detergents for kitchen use and for various chemical products.

Tonen-Exxon Chem. Firm Starts For Petroleum Resin Operation

Tonen Sekiyukagaku K. K. and Exxon Chemical Co. of the U.S. established on Nov. 30 Tonex Co. — an equally owned joint venture in Japan for manufacture and sales of "Escorez" petroleum resin developed by Exxon.

Tonex has been formed by combining the petroleum-resin sales division of Exxon Chemical Japan Ltd., a 100%-owned Japanese subsidiary of Exxon Chemical, and the resin manufacturing division of Tonen. The new company will enter fullfledged operations after next February.

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New Developments from Japan

Larger-area Silica Glass Made By Sol-Gel Process

Professor S. Sakka of Institute for Chemical Research, Kyoto University has established technology for producing large-area silica glass by means of a sol-gel process. The sol-gel process for new-glass manufacture is attracting industrial attention but its application to large-area new glass has been considered difficult.

Compared with the conventional melting process for making common glass, the new process offers these features: (1) larger-area silica glass — high-grade, expensive glass — can be synthesized at a lower tempera-

ture; and (2) the produced glass is very homogeneous because its materials are mixed on a molecular level.

The researcher said he succeeded in obtaining silica glass of a larger area by increasing the gel particle size to more than 1 micron by raising the amount of hydrochloric acid to be added to the material to 0.4 in terms of molar ratio and applying heat. The glass area can thus be increased to more than 24 cm in length by 19 cm in width, with a thickness of 1 cm, he added.

The new glass may be used for photo mask sheets for semiconductors and optical fiber rods, etc., he said.

Nippon Steel and Kurosaki Yogyo Develop Mullite Ceramics

Nippon Steel Corporation and Kurosaki Yogyo Co. have announced the joint development of mullite ceramics. "Ceramics Development Center (Kita-Kyushu City)", their joint-venture company engaged in the development technology has succeeded in the development of this new product.

The combination of source material processing technology based on colloid chemistry with an original production process for sintered materials makes possible the reduction of glass substances in ceramics and the addition of high thermal resistance and high strength characteristics to the product.

The two parent companies are engaged in the supply of samples and are planning to develop a wide range of applications to heat and corrosion resistant materials and machine components.

When compared with other oxidized ceramic products, mullite ceramics is more excellent in terms of softening characteristics under load. Its thermal expansion coefficient and modulus of elasticity are smaller than those of alumina, and it shows excellent heat and shock resistance. Its specific gravity is smaller than that of other oxidized materials such as alumina and zirconia and is almost the same as that of silicon carbide and silicon nitride. Unlike non-oxidized ceramics, this product does not show any degradation due to oxidation and thus is attracting attention as a material for high-temperature structures.

Because of these features, various companies are competing for its development. However, it is said that it is difficult to redu-

EXCITING NEWS FOR... CHEMICAL INDUSTRIES

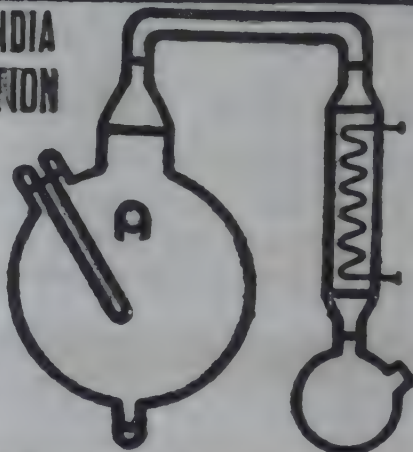
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Baroda city office : 322382, Resi: 320167

ce hazardous impurities such as alkali metal oxides and alkali earth metal oxides.

Nippon Steel Corporation and Kurosaki Yogyo Co. combine the latest source material processing technology based on a colloid process which is a kind of sol-gel process with a sintered material production process. This technology can successfully reduce glass substance in ceramics to a considerable extent and produce mullite ceramics with high heat resistance and high strength. The Ceramics Development Center produces two kinds of this product: standard grade and a grade whose heat resistance and strength are reinforced. The two parent companies are supplying samples of these grades.

The parent companies' target is a wide range of applications including core and reaction tubes for electric furnaces and heat- and corrosion-resistance materials for crucibles, thermocouple tubes and large-scale integrated circuit boards. For the time being, however, they will focus their attention to the applications to machine components making full use of the features of mullite ceramics.

Harder-Than-Iron/Copper High Polymer Synthesized

Researchers at Research Institute for polymers and Textiles have successfully synthesized a 2-dimensional high polymer whose elastic modulus and hardness are higher than those of pure iron and copper. The product is 2-dimensional bulk polyamide, which was produced through 2-stage solid-phase polymerization.

In connection with this, they paid close attention to the fact that nylon salt is transformed into polyamide crystals through polycondensation in a solid phase.

Judging from the diamond structure involved, it is ideal to produce high-performance, high-polymer material having high strength and elastic modulus by completely crystallizing multi-dimensional covalent molecules. It is however, difficult to control the arrangement of crosslinked macromolecules. Almost all research results hitherto announced are concerned with highly oriented crystallization of 1-dimensional macromolecules.

Industrial sources hope to produce high-polymer material with superb mechanical properties by regularly crosslinking high-polymer chains, which are highly oriented in two dimensions.

Unitika Develops Hemostat Containing 2 Blood Components

Unitika Ltd. has pioneered a new hemostat (development code: GTXIII) by freeze-drying a

mixture of two blood components — thrombin and XIII (F-13) blood coagulation factor — and gelatine. When used, it is injected into the human body after being transformed into a sol state with the addition of normal saline solution.

It takes about 2 minutes for bleeding to stop completely. The time is one-fourth that needed for the conventional Sonde method designed to stop bleeding by pressing a diseased part. In addition, it is completely free from side effects.

The company envisages applying the product to patients suffering from chronic liver disease and esophageal varices.

The product turns fibrin insoluble, thereby coagulating blood and stopping bleeding. Blood does not coagulate when thrombin acts on fibrinogen — a blood component — and soluble fibrin is thus formed.

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- A special section on Machinery & Equipments for the Industry is also being planned.

For details Please contact the publishers :

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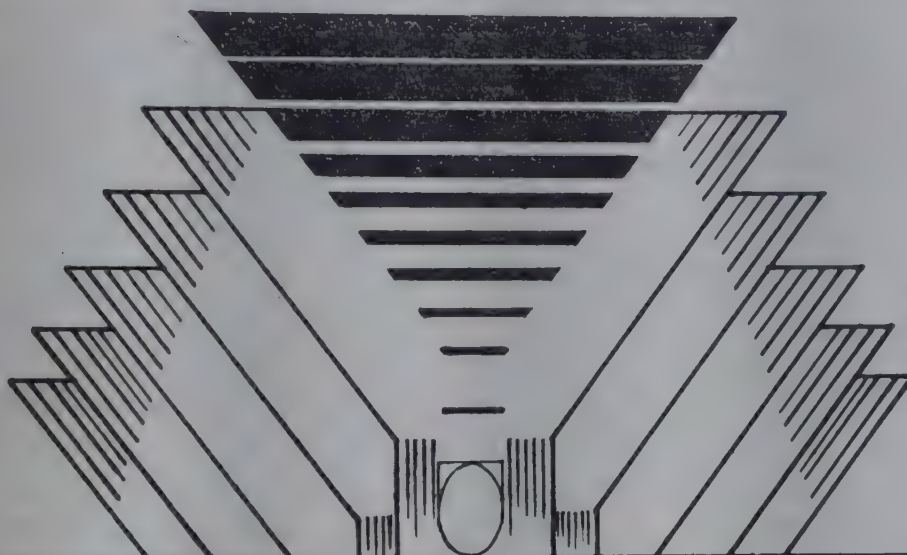
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Deepak Nitrite

The directors of Deepak Nitrite Ltd. have stepped up the dividend for the year ended October 1987 to 15 per cent (against 14 per cent paid for the previous year).

The proposed dividend will absorb Rs. 36.45 lakhs against Rs. 34.02 lakhs in the previous year according to company press release. The company's turnover for the year improved by 12 per cent to Rs. 28.75 crores against Rs. 21.12 crores in 1985-86. The gross profit too moved up by 14 per cent to Rs. 2.64 crores, against Rs. 2.32 crores. After providing for depreciation Rs. 148 lakhs (Rs. 122 lakhs), for taxation Rs. 18.91 lakhs (Rs. 49.57 lakhs), and for prior adjustment Rs. 0.61 lakhs (Rs. 2.35 lakhs), the net profit rose Rs. 96.67 lakhs against Rs. 58.34 lakhs.

The company has started the current year quite well with the continued good demand for its products, both in the domestic and export markets, the release added.

S. M. DYECHEM

SM Dyechem has declared a final dividend of 10 per cent for the year ended August, 1987. Together with the interim dividend of 14 per cent, the total dividend for the year is 24 per cent, compared to the pro-rata dividend of 24 per cent paid for the previous year. Total income has risen from Rs. 4.10 crores in 1985-86 to Rs. 6.25 crores in 1986-87 and the gross profit from Rs. 43.18 lakhs to Rs. 63.41 lakhs. After providing Rs. 3.22 lakhs (Rs. 1.96 lakhs) for depreciation and Rs. 10 lakhs (same),

the net profit is higher at Rs. 50.19 lakhs (Rs. 31.22 lakhs).

The company has decided to extend its technical collaboration with Allied Colloids Ltd. U.K., for speciality products. Further significant growth is expected from the company's recently commissioned plant in technical collaboration with Schimmer and Schwarz of West Germany for the manufacture of speciality surfactants.

The company proposes to diversify into areas of package foods. It plans to produce extruded pasta snack products in technical collaboration with Mapimpianti Spa, Italy. This project at Thane and Pune is expected to cost around Rs. 5.80 crores, part of which is proposed to be met through the issue of convertible rights debentures to the existing shareholders. The new project is expected to go on stream by the middle of this year.

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MARKET INFORMATION

Transport Strike Called off

The three week Bombay's transport strike was called off on the 20th Jan., easing movements in the chemical market. Upcountry materials have started arriving.

Titanium dioxide continued to be in short supply, cyclohexanone shot up

to Rs. 55/- on acute shortage. PVA 173 and GH 17 were in tight supply. Caustic soda and soda ash remained at previous levels.

Thiourea moved up by Rs. 5/- in the dyes market. Acetoacetic ester and crude naphthalene had good demand.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

Naphthalene crude was up by Rs. 2/-. All varieties of dyestuffs had normal turnover.

(Prices as on 20th January, 1988)

INDUSTRIAL CHEMICALS	Per kg.				
Ammonium sulphate	2.00	Boric acid (Tech.)	21.00	Cream of Tartar (Tech.)	64.00
Ammonium phosphate (Mono)	14.50	Bisphenol-A	48+ST	Citric acid (Belgium)	40.00
Ammonium phosphate (Di)	12.00	Butyl carbitol	35.00	Citric acid (Indian) (Resale)	46.00
Ammonium carbonate (Di)	17.00	Caustic soda (Flakes)	8.50	Copper sulphate	17.00
Ammonium bicarbonate	4.75	Caustic soda (Solid)	7.75	Chromic acid	50.00
Ammonium chloride	3.50	Caustic soda (Lye)	6.00	Cyanuric chloride	120.00
Ammonium nitrate	4.00	Calcium chloride 70% (solid)	3.25	Cobalt oxide	280.00
Arsenic white powder	21.00	Calcium chloride 75-80% (fused)	3.50	Carbitol	52.00
Acrylamide	60.00	Calcium chloride 36% (Anhydrous)	5.00	Dicalcium phosphate (Anhydrous)	16.00
Barium carbonate	6.00	Calcium Carbonate PPT	3.00	Ferric chloride (Lumps)	6.00
Bleaching powder (33% Cl)	3.75	Calcium carbonate (Activated)	3.55	Ethylene urea	56.00
Borax (Granular)	15.00	Camphor (Indian)	80.00	Glue flakes	8.45
Borax (Powder)	15.50	Cresylic acid	50.00	Glue sheets	6.75
				Gohsenol GH-17	85+ST

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Hyflosupercell	19+ST	Santobrite (Indian)	38.00	Carbon Tetrachloride	12.50
Hexamine	29.00	Soda Ash (Tata)	3.90	Cyclohexanone	52.00
Industrial Wax	25.00	Soda Ash (Birla)	3.75	Cyclohexanol	43.00
Litharge	15.00	Soda Ash (Imp.)	3.50	Diacetone	34.00
Lead Acetate (Tech.)	28.00	Sodium bicarbonate	5.25	Diethylene glycol (DEG)	31.00
Lithopone	15.00	Sodium bisulphite	4.50	Diethyl Phthalate	52.00
Magnesium chloride (crystal)	2.00	Sodium silicate	3.00	Diallyl Phthalate	58.00
Menthol crystal (Flakes) 185+Ex.+ST		Sodium acetate	5.90	Dimethyl Phthalate	28.00
Menthol bold 205+Ex.+ST		Sodium alginate	220+ST	Diethyl Adipate	52.00
Menthol crystal bold 245+Ex.+ST		Titanium Dioxide (Anatase)	52+ST	Dibutyl Adipate	42.00
Magnesium carbonate (Japan)	16.00	Titanium Dioxide (Rutile — RCR ₂)	60+ST	Dipentene	15.00
Magnesium carbonate (Indian)	15.00	Tartaric acid (Crystal)	94.00	Dimethylamine 40%	12.00
Maleic Anhydride (per kg)	38.00	Trisodium phosphate	4.80	Dimethylamine 60%	14.00
Mercury (75 lbs.)	9,000.00	Thiourea	70+ST	Ethyl Acetate	23.65
Nickel chloride	60.00	Urea (Tech)	2.75	Ethyl Acrylate	48.00
Oxalic acid	20.00	Vacuum salt	1.00	Ethylene Dichloride	11.00
Peppermint oil (Rectified) 90+Ex.+ST		Zinc Dust	30.00	Ethylene Glycol	23.25
Potassium carbonate (Indian)	19.00	Zinc Oxide	30.00	Formic Acid (Imp.)	27+ST
Potassium carbonate (Imported)	21.00	Zinc chloride powder (technical)	14.00	Formaldehyde	5.80
Potassium bichromate	22.00	Zinc sulphate	3.90	Glycerine (CP)	49.00
Potassium phosphate (Mono)	14.00			Glycerine (IW)	45.00
Potassium phosphate (Di)	14.00			Hydrogen peroxide 50% (Resale)	27.00
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Polyvinyl alcohol (No. 173)	92+ST	SOLVENTS	Per kg.	Isobutyl Alcohol	28.00
Polyvinyl alcohol (No. 208)	95.00	Acetic Acid (Glacial)	13.50	Monoethanolamine	46.50
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Phthalic anhydride 96%	23.25	Acetone (Resale)	19.00	Morpholine (Indian)	65.00
Pentaerythritol (Resale)	53.00	Adipic Acid	50.00	Methyl Ethyl Ketone	36.00
Paraffin wax	13.50	Aceto Acetanilide	50.00	Methyl Isobutyl Ketone	38.00
Rangolite (German)	70.00	Aniline Oil	44.00	Methyl Acrylate	42.00
Rangolite (Czech.)	48.00	Benzoate Plasticiser	33.00	Methylene Dichloride	24.00
Sodium sulphate (Fine)	4.00	Butyl Acetate	42.00	Meta Cresol	45.00
Sodium sulphate (Coarse)	3.80	Butyl stearate	38.00	Nitrobenzene	17.00
Sodium sulphide 50-52% (Flakes)	8.00	Butyl acrylate	66+ST	Nitric Acid (Con.) (RCP)	2.50
Sodium sulphide 58-60% (Flakes)	9.00	Butanol (Resale)	35.00	Ortho Cresol	32.00
Sodium sulphide pure (Flakes)	12.25	Benzyl chloride	24.00	Phenol	35+ST
Sodium nitrite	13.25	Benzo trichloride	18.00	Propylene Glycol	30.00
Sodium chlorite 80% (Spain)	90.00	Benzoyl chloride	22.00	Polyethylene Glycol (No. 200)	40.00
		Benzyl alcohol (FPC)	36.00	Polyethylene Glycol (No. 400)	37.00
		Bromine Liquid	42.50	Polyethylene Glycol (No. 500)	42.00

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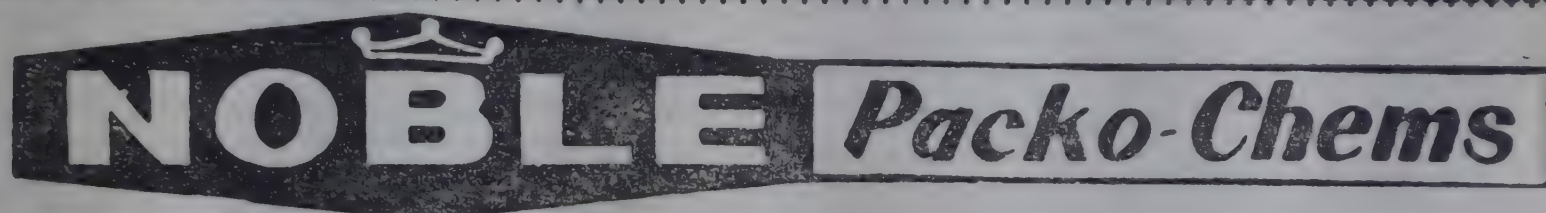
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Phone: 471318/482718/474714

Polyethylene Glycol (No. 1600)	14.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (No. 6000)	50.00
Para Cresol	40.00
Styrene Monomer	32.00
Sorbitol	16.50
Trichloroethylene	26.00
Triethanolamine	50.00
Sulphuric Acid	2.10
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Triethylamine	50.00
Vinyl Acetate Monomer	40.50

SOLVENTS	Per Litre
Benzene	8.80
N-Heptane	8.00
N-Hexane	8.75
Methanol	6.75
Solvent Naphtha Heavy	9.50
Solvent Naphtha Light	8.50
Toluene	9.25
Xylene	14.00

DYES INTERMEDIATES PRICES ARE WITHOUT TAX & EXCISE

	Per kg.
Alphanaphthylamine	60.00
Alpha Naphthol (Imp.)	160.00
Aceto Acetic Ester (Methyl)	68.00
Ammonium Molybdate	170.00

Anthraquinone	80.00
Anthranilic Acid	60.00
2-Amino-4-Nitrophenol (Imp.)	140.00
Blue B. Base (Local)	235.00
Beta Naphthol (Atul)	55.00
Benzidine Dihydrochloride (BDH)	72.00
Bromamine Acid	375.00
BON Acid	107.00
Chicago Acid	280.00
Coach Acid	53.00
C. Acid (Imp.)	260.00
Cyanuric Chloride (Japan)	118.00
2, 4. DNCB	26.00
Dihydrothio PTOS (Imp.)	500.00
Dimethyl Aniline	58.00
Diethyl Aniline	145.00
Di-amino stilbene disulphonic acid	120.00
3, 3-DCB (Imp.)	165.00
Gamma Acid (Atul)	160.00
H. Acid (Atul)	150.00
G. Salt	56.00
Isophthalic Acid	39.00
J. Acid	270.00
J. Acid Urea	270.00
K. Acid	95.00
MDPS (German)	200.00
MNA	75.00
Meta Ur'do Aniline	135.00
MPD (Local)	130.00
MPD (Japan)	150.00

Naphthenic Acid	11.00
N- Methyl J. Acid	390.00
N-Methyl Aniline	135.00
Naphthalene crude	20.00
Naphthalene (Refined)	22.00
Ortho Anisidine (OA Imp.)	84.00
Ortho Dichloro Benzene (OBCB)	10.00
OT Base	93.00
Para Dichloro Benzene (PDCB)	15.00
Para Anisidine (PA-Imp.)	110.00
Para Anisidine (PA-Local)	87.00
PNA	66.00
Para Cresidine (Imp.)	325.00
Para Amino Azo Benzene (India)	125.00
PNCB	27.50
Para Amino Acetanil'de	140.00
1-Phenyl 3-methyl-5 Pyrazolone	115.00
Phenyl J. Acid	340.00
Para Amino Benzoic Acid	170.00
PT Base	88.00
Rhoduline Acid	500.00
Resist Salt	18.00
Resorcinol	140.00
Sodium Naphthlonate	62.00
5-Sulpho-Anthranilic Acid	60.00
Sulphanilic Acid	26.00
Sulpho Tobias Acid	100.00
Trichloro Benzene (TCB)	15.00
Tobias Acid	105.00

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ETHYL CHLORO ACETATE

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Phone : 315681 (O)
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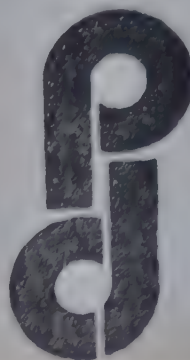
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PHONE: OFF: 331119 - RES: 6120814.

Bombay Dyes Market

(Prices as on 20th January, 1988)

ACID COLOUR	Per Kg				
Acid Violet 4BS	143.00	Brill. Violet Extra	126.40	Scarlet RR	214.85
Acid Maroon V	110.00	Blue 2B	86.60	Rubine 3B	223.05
Acid Orange II	77.80	Blue G	170.50	Rubine CB	364.90
Acid Orange ILY	63.05	Sky Blue FB	188.25	Blue GL	318.95
Acid Red A	107.25	Copper Blue GR	147.00	Blue BGF	636.55
Crosein Scarlet MOG	155.00	Fast Greenish Blue GL	114.60	Navy Blue RF	270.40
Acid Scarlet 3R	99.90	Developed Black BT	116.10	Brown 3REL	200.40
Acid Red 38N	135.00	Blue NB-2B	300.20	Black GEL	324.20
Acid Red R2R	132.00	Blue NB-2BC	185.30	Dark Brown 3B	317.40
Acid Red RS	88.00	Developed Black NB-GHB	185.30		
Acid Green V	230.00	Green B	111.65	BASE COLOURS	Per Kg
Acid Patent Blue AS	250.00	Green NB-B	188.25	Fast Yellow GC	80.20
Acid Coomasi Blue	200.00	Green 2B-N	188.25	Fast Orange GC	135.45
Acid Yellow 5GN	65.00	Brown MR	154.40	Fast Scarlet R	166.90
Acid Red PG	85.00	Brown CN	107.25	Fast Scarlet RC	126.65
Acid Red GRS	78.00	Golden Brown G	140.35	Fast Scarlet RCR	99.05
Acid Black 10 BX	121.95	Catechin G	120.50	Fast Scarlet G	121.65
Acid Black BX	98.40	Omega Tan	126.40	Fast Scarlet GN	91.50
Acid Black Wax	135.50	Catechin GS	102.80	Fast Scarlet GG	72.70
Procinil Yellow GS		Black E Hly Conc.	142.60	Fast Scarlet GGS	72.75
(ICI, UK)	265.00	Black E Extra Hly Conc	142.60	Fast Red B	203.20
Procinil Red GS (ICI, UK)	530.00	Black NB-ER Hly. Conc.	310.50	Fast Red RC	119.15
Procinil Blue RS (ICI, UK)	315.00			Fast Red R Flakes	149.25
Procinil Scarlet G		DISPERSOL COLOURS	Per Kg	Fast Red TR	166.80
(ICI, UK)	600.00	Yellow 6G Powder	143.80	Fast Red TR Oil	183.15
Procinil Orange G		Red B 3B Powder	247.80	Fast Red RL	237.10
(ICI, UK)	250.00	Red B 2B Powder	323.20	Fast Red KB Oil	201.90
Procinil Rubine (ICI, UK)	550.00	Red CB Powder	439.15	Fast Bordeaux GP	201.95
		Red D2B Powder	477.40	Fast Garnet GBC	94.05
DIRECT COLOURS	Per Kg.	Violet C 4R	521.90	Fast Violet B	505.60
Yellow 3GX	88.10	Blue BG Powder	235.45	Fast Blue BB	521.45
Gun Yellow RCH	124.00	Blue BN Powder	103.75		
Fast Yellow GCH	141.15	Blue D 2R Powder	476.25	NAPHTHOL COLOURS	Per Kg
Yellow CFG Hly. Conc.	312.00	Navy BT Powder	243.90	ASG	217.00
Fast Yellow GS	111.65	Blue B 2G Powder	210.20	AS	143.00
Fast Yellow CHRS	95.45	Black BT Powder	182.60	ASSW	279.75
Viscose Orange A	166.15	Blue BR Powder	390.20	ABBS	189.15
Fast Orange GR	133.75	Yellow 7GL	338.60	ASBO	195.65
Red	96.90	Yellow 5RX	218.80	ASD	175.50
Dark Tan	78.25	Yellow 3G	367.25	ASOL	179.35
Red IIR	72.55	Yellow	140.00	ASTR	279.75
Red 4B	169.10	Yellow AL	135.30	ASPH	279.75
Bordeaux BW	132.30	Yellow Brown REL	247.50	ASE	196.05
Fast Scarlet 4BS	166.55	Yellow FFL	463.60	ASEI	184.40
Red 12B	170.55	Gold Yellow GG	259.70	ASLB	1632.60
Bordeaux Hly Conc.	194.00	Pink REL	247.00	ASBT	1817.00
Cotton Red N	117.05	Red REL	468.65	ASWG	143.00
Brill. Fast Helio B	278.00	Red 2B	327.40	ASSG	397.70
Brill. Fast Helio 2B	297.00	Red FB	324.20	ASSR	480.50
Brill. Fast Helio 2B	297.00	Red Violet FBL	469.85		
Brill. Fast Helio 2RS	136.20	Orange 3R	196.65		
Brill. Fast Helio BS	116.10	Violet 3R	280.00		
		Violet RL	275.45		
		Violet 6R	485.75		

PROCION COLOURS

Per Kg.

Golden Yellow HR	181.80
Brill. Yellow H4G	117.85
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M4G	177.10
Brill. Yellow M8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2R	241.85
Brill. Red H 7B	157.95
Brill. Orange M 2R	313.15
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.95
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GF	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30

Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg.)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H IF	143.25
Orange Brown H 2B	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS

Per Kg.

Navy Blue	99.85
Green G	158.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc.	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)

Per Kg

Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disp.	713.20
Brill. Purple 4R Conc. Pdr.	470.75
Brill. Purple 3R Acra Powder	690.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625.95
Blue R Powder Fine	542.15
Blue BC Conc. Pdr. Fine	522.50
Blue BC Acra Conc. Pdr. Fine	762.70

Blue R Conc. Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc. Powder	645.80
Brill. Blue 2R Hly. Conc.	378.55
Brill. Blue 2R Supra Disp.	115.85
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp.	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Powder	823.90
Jade Green 2G Pdr. Fine	419.65
Jade Green 2G Ptg. Paste	125.40
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Supra Disp.	406.00
Olive Green B Pdr. Fine	399.90
Olive D Pdr. Fine	444.30
Olive Green B Supra Disp.	308.25
Jade Green XBN Supra Disp. (N)	327.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	538.05
Olive R. Pdr. Fine	422.95
Olive D Supra Disp.	361.70
Olive R Supra Disp.	363.90
Olive D. Ptg. Paste	193.00
Olive Green B. Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc.	640.00
Olive Green B Acra Conc.	542.75
Brown R Pdr. Fine	835.00
Brown G. Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G. Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc.	733.95
Brown R Acra Conc.	766.00
Grey M. Powder Fine	768.80
Grey M. Supra Disp.	585.45
Blue BC Acra Conc. Pdr. Fine	762.70
Direct Black AC Supra Disp.	330.35
Direct Black AC Pdr. Fine	474.70
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI: JAN. 22 (NNS) — A sharp rise of Rs. 35/40 in menthol provided the main feature of trading in the local chemicals market during last week, says NNS. Mercury also spurted by Rs. 200, whereas ammonia bicarb, caustic soda and rangolite showed an downward trend to slack off-take.

Menthol flake and bold jumped up from Rs. 180 and Rs. 200 to Rs. 220 and Rs. 235 per kg. respectively following restricted arrivals from U.P. Fall in production of menthol due to power cut in U.P. also aided the sentiment. About one tonne of menthol daily purchased by the speculators. During this month menthol flake and bold recorded a gain of Rs. 60/62 per kg. Mentha oil advanced by Rs. 20 and Rs. 172 and DMO edged up by Rs. 10 at Rs. 75.

Mercury went up sharply by Rs. 200 at Rs. 9,200 per flask due to acute shortage of floating stocks along with higher Bombay advices, where its prices rose from Rs. 8000 to Rs. 9000. Within two weeks its prices recorded a handsome gain of Rs. 500. Paraffin wax looked up by Rs. 20 at Rs. 600 owing to paucity of supply

along with keen demand by candle manufacturers. Refined wax was not available in the market. Borax crystal advanced by Rs. 20 at Rs. 600 in the face of good demand by consumers. Boric acid technical were on demand at Rs. 1000 per 50 kg.

Citric acid advanced further by Rs. 50 at Rs. 2300/2500 owing to tight stock position. Titanium dioxide Anatase jumped up from Rs. 53.50 to Rs. 57.00 in the wake of fall in supply from Kerala. RC-822 also rose from Rs. 73 to Rs. 80 owing to acute shortage of stocks but at the weekend due to nervous selling by stockists it turned easy and closed at Rs. 73. Rangolite Germany tumbled down by Rs. 3 at Rs. 65 due to slack off-take. Sodium hydro sulphite Kalali declined by Rs. 50 paise at Rs. 35.50 due to reduced demand by gur khandsari manufacturers. Caustic soda flake and solid softened by Rs. 3/5 at Rs. 375/380 and Rs. 385 in the face of increased offerings. Ammonia bicarb eased by Rs. 2 at Rs. 128 in the wake of increased arrivals of Mangalam chemicals.

Dyes and colours remained unchanged.

(DELHI MARKET RATES AS ON JANUARY 22, 1988)

Ammonia Bicarb (per 25 kg)	128.00	Boric acid Technical (per 50 kg)	1000.00
Mercury (per flask)	9,200.00	Paraffin wax (per 50 kg.)	600.00
Soda ash (per bag)	255-285.00	Tartaric acid (per 50 kg)	7,250.00
Ammonium Chloride (per 50 kg.)	110-180.00	Borax Granular (per 50 kg)	580.00
Caustic soda solid (per 50 kg)	385.00	Borax Crystal (per 50 kg)	600.00
Caustic soda flakes (per 50 kg)	375-380.00	Sodium Nitrite (per 50 kg)	650.00
Citric acid (per 50 kg)	2,300-2,500.00	Sodium Nitrate (per 50 kg)	380.00
Stable Bleaching Powder Shyam (per 25 kg)	96.00	Camphor Powder (per kg)	87.00
Stable Bleaching Powder KCI (per 25 kg)	89.00	Camphor Thal (per kg)	95.00
Stable Bleaching Powder MODI (per 25 kg)	92.00	Menthol Flake (per kg)	220.00
Sod. Bicarbonate (per 50 kg)	250.00	Menthol Medium (per kg)	228.00
Sod. Hydro Sulphite (per kg.)	32-35.50	Menthol Bold (per kg)	235.00
Rangolite (per kg)	42.50-65.00	Glycerine (per kg)	45-55.00
		Sodium Silicate (per quintal)	250.00
		Hexamine (per kg)	26.00
		Acetic Acid Glacial (per kg)	14.50-18.00

Copper Sulphate (per quintal)	1800-2100.00
Formic acid (per kg)	29.00
Formaldehyde (per kg)	8.50
Hydrogen Peroxide (per kg)	26-30.00
Calcium Carbonate (per tonne)	2500-4000.00
Acid Slurry Soft (per kg)	25.00
Acid Slurry Hard (per kg)	32.00
Phosphoric Acid (per 50 kg)	825.00
Pot. Nitrate (per quintal)	900-1200.00
Pot. Permanganate (per 50 kg)	2300.00
Sod. Bichromate (per 50 kg)	1025-1125.00
Tri-Sod. Phosphate (per 50 kg)	325-330.00
Titanium Dioxide Anatase (per kg)	56.50
Titanium RC-822 (per kg)	73.00
Zinc Oxide (per mt)	34000-38000.00
Phenol Carbolic Acid (per kg)	42.00
Carbon Tetrachloride (per kg)	16.50
Chloroform (per kg)	26.00
Sodium Sulphate (per 50 kg)	160-165.00
Naphthalene Balls (per 50 kg)	1200.00

DYES & COLOUR per kg.

Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES (per kg)

Black E. Conc.	92-155.00
Diazo Black B.T.	125.00
Green B.	119.00
Blue 2-B	86.00
Sky Blue FB	200.15
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B.500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Bombay Drugs Market

(Prices as on 20th January, 1988)

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such, they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some idea of market conditions.

Product	Rs. per kg.		
Acetazolamide IP	700.00	Ethambutol IP	650.00
Acriflavine BPC	800.00	Ferrous Fumarate	45.00
Aluminium Hydroxide IP	21.00	Folic Acid IP	5000.00
Ampicillin Trihydrate	2,000.00	Furosemide IP	1,210.00
Aspirin IP	72.00	Furazolidone IP	285.00
Barium Sulphate	19.90	Gentamycin Sulphate	9.20
Belladonna Extract	74.50	Gum Acacia	57.00
Benzoic Acid IP	31.40	Gum Acacia White	95.00
Caffeine Citrate IP	305.00	Gum Guar	26.00
Caffeine IP	1000.00	Hematropine Methyl Bromide	9.25
Calcium Gluconate IP	35.00	Ibuprofen IP	460.00
Calcium Glycerophosphate	141.00	I.N.H.	215.00
Calcium Hypophosphate BPC	128.00	Inosite IP	560.00
Calcium Phentionate	450.00	Iodochloro	305.00
Calomel BP	330.00	Iodoform NF	540.00
Cetrimide IP	215.00	Lactose IP	31.00
Chloroquine Phosphate	530.00	Lactic Acid	68.00
Choline Chloride FG	33.00	Lignocaine HCl	255.00
Choline Chloride IP	65.00	Lignocaine Base	255.00
Citric Acid IP	42.00	L. Lysine Feed	135.00
CMC Sodium HV	85.00	L. Lysine Pharma	180.00
C. P. Maleate IP	905.00	Magaldrate IP	51.00
Dapsone IP	320.00	Magnesium Carbonate IP	15.00
D. C. Citrate	300.00	Magnesium Hydroxide	20.50
Dexamethasone	75.00	Magnesium Hypophosphate	125.00
Diastase (1:50)	58.00	Magnesium Trisilicate IP	11.50
Diazepam IP	600.00	Mannitol USP	64.00
Di Iodo Hydrin	350.00	Mebendazole	620.00
Diloxanide Fumarate IP	400.00	Mercurochrome NF	285.00
Di Phenyl Hydrogen Citrate	198.00	Menthol	190.00
Di Sodium Hydrogen Citrate	43.00	Metronidazole IP	415.00
D-Panthenol Liquor	550.00	M. P. S.	142.00
Ergomatrine Maleate	165.00	Niacinamide	143.00
		Oil Mentha	80.00
		Oxyphenbutazone	565.00
		Papaine BPC	51.00
		Paracetamol	110.00
		Pectine IP	233.00
		Pepsin 1:3000	450.00
		Phen'ramine Maleate	700.00
		Phenyl Butazone USP	255.00
		Potato Starch	65.00
		Rifampicin IP	2,900.00
		Saccharine Sodium	225.00
		Salbutamol Sulfate	8.25
		Sodium Hydrophosphate	125.00
		Sodium Salicylate	70.00
		Sorbitol Powder	125.00
		Sorbitor USP	17.25
		Sulfacetamide	268.00
		Sulphamethoxazole	450.00
		Tinidazole	378.00
		Theophylline Anhy.	700.00
		Trimethoprim IP	920.00
		Vitamin A, Palmitate	2,650.00
		Vitamin B1 Hydrochloride	2,300.00
		Vitamin B1 Mono nitrate	1700.00
		Vitamin B2	2,500.00
		Vitamin B6 Hydrochloride	1600.00
		Vitamin B12	135.00
		Vitamin B2 5-Phosphate	3,900.00
		Vitamin C Plain	258.00
		Vitamin C coated	268.00
		Vitamin K ₃ W/S	750.00
		Yeast Powder	24.00

MATERIALS IMPORTED

BOMBAY

(From 3-12-87 to 4-12-87)

(Cost of Imported Item is
CIF Value)

ACETONE: From Indonesia: Kankoo Paints & Varnish Co., 25,740 kgs., Rs. 1,99,364.

ACETYL ACETONE: From USA: Indian Drugs & Pharmaceuticals, 62.58 m.t. Rs. 22,03,539.

ACRYLIC ACID: From Japan: Aquapharm Chemical Co. P. Ltd., 10,000 kgs., Rs. 1,90,613.

2-AMINOBUTANOL: From FRG: Lupin Laboratories P. Ltd., 30,420 kgs., Rs. 30,45,031.

AROMATIC CHEMICALS: From FRG: Sai Aromas P. Ltd., 375 kgs., Rs. 86,629; From Netherlands: Hindustan Lever Ltd., 20 kgs., Rs. 8,523; Fine Fragrances P. Ltd., 65.63 kgs., Rs. 33,586; From Switzerland: Hindustan Lever Ltd., 1,325 kgs., Rs. 2,34,732; From UK: Rishabh & Co., 506 kgs., Rs. 50,484.

BETA PHENYL ETHYLAMINE: From FRG: Cadila Chemicals P. Ltd., 600 kgs., Rs. 90,639.

BLEACHING EARTH: From Japan: Allana Oil Mills, 17 m.t. Rs. 94,734.

BIS-HYDROXY ETHYLETHETHER OF BUTYNEDIOL: From FRG: Grover & Weil (I) Ltd., 2,080 kgs., Rs. 1,80,232.

BISPHENOL-A: From Brazil: Cibatul Ltd., 50,000 kgs., Rs. 7,08,506; Synthetic and Polymer Industries, 20,000 kgs., Rs. 2,88,237.

2-BUTENE-1, 4-DIOL: From USA: Excel Industries Ltd., 32,745 kgs., Rs. 18,60,064.

2,6-DI-T-BUTYL - 4 - METHYL PHENOL: From FRG: Siro Plast Ltd., 50 kgs., Rs. 19,910.

BUTYL PHENOL: From USA: Indian Plastics Ltd., 6.74 m.t., Rs. 1,18,232.

N-BUTYNIC ACID: From FRG: Flavours & Fragrances of India, 3,060 kgs., Rs. 69,902; Chemco Fine Chemicals, 3,000 kgs., Rs. 68,532.

C-ACID: From Korea: Goodlass Nerolac Paints Ltd., 1.5 m.t., Rs. 75,264.

CAPROLACTAM: From Belgium: Jagatjit Cotton Mills Ltd., 2,48,500 kgs., Rs. 62,17,970.

CARBONYL: From USA: Devidayal P. Ltd., 32 m.t., Rs. 15,59,044.

CAUSTIC SODA FLAKES: From FRG: Indian Dyestuff Industries Ltd., 100 m.t., Rs. 4,16,269; From Poland: Metro Exporters P. Ltd., 200 m.t., Rs. 7,25,401.

4-CHLORO-2, 5-DIMETHOXY-NITROBENZENE: From FRG: Colour Chem Ltd., 1,241 kgs., Rs. 2,28,751.

CLOVE LEAF OIL: From Indonesia: Rishabh & Co., 2,000 kgs., Rs. 66,940.

CYANO ACETIC ACID: From USA: Pharma Indiana Laboratories, 1,875 kgs., Rs. 1,50,182.

CYANURIC CHLORIDE: From FRG: Synthofine Chemicals, 4,000 kgs., Rs. 1,71,724; From FRG: Synthofine Chemicals, 4,000 kgs., Rs. 1,71,724.

CYSTEAMINE HYDROCHLORIDE: From Japan: Ranbaxy La-

boratories Ltd., 1,000 kgs., Rs. 12,24,462.

DANE SALT: From Japan: Cepham Laboratories Ltd., 1,500 kgs., Rs. 3,52,493.

DESMODUR T-80: From Belgium: Jai Industries, 17,000 kgs., Rs. 4,83,891; From FRG: Jai Industries, 17,000 kgs., Rs. 4,83,891.

2,3-DICHLORO-1, 4-NAPHTH-AQUINONE: From Japan: Hans Chemicals, 500 kgs., Rs. 66,890.

DIETHYL OXALATE: From China: South Industrial Research Institute Ltd., 15.60 m.t., Rs. 3,33,981.

DICYANDIAMIDE: From FRG: Franco-Indian Pharmaceuticals, 5,000 kgs., Rs. 1,16,189.

2,6-DIMETHYL -7- OCTEN - 2 -DIOL: From USA: Hindustan Lever Ltd., 862 kgs., Rs. 85,591.

DIMETHYL SULPHOXIDE: From USA: Pragati Pharmaceuticals P. Ltd., 907 kgs., Rs. 21,183.

ETHYL HEXANOIC ACID: From France: Lona Industries, 5,920 kgs., Rs. 92,092.

2-ETHYL HEXANOL: From FRG: Colour Chem Ltd., 10,150 kgs., Rs. 1,54,312.

ETHYL VANILLIN: From France: Hoechst India Ltd., 600 kgs., Rs. 1,66,814; Rallis India Ltd., 350 kgs., Rs. 93,388.

ETHYLENE CHLOROHYDRINE: From FRG: Indian Dyestuff Industries, 2,530 kgs., Rs. 68,757.

ETHYLENE GLYCOL MONO ETHYL ESTER: From FRG: Tata Exports Ltd., 15,288 kgs., Rs. 1,93,299; K. Uttamlal (Exp.) P. Ltd., 9,880 kgs., Rs. 1,27,636.

FORMIC ACID 85: From FRG: Santilal Manilal & Co., 10.08 m.t., Rs. 76,067.

FUMED SILICA: From Belgium: Twincity Organics P. Ltd., 1,860 kgs., Rs. 1,65,566.

GAMMA FERRIC OXIDE: From FRG: Jai Electronic Industries P. Ltd., 2,000 kgs., Rs. 1,55,969.

GILSONITE: From USA: Bharat Chemicals & Paint Industries, 17.46 m.t., Rs. 1,16,754.

GINGER OIL: From Switzerland: M. C. Davar Aromatics P. Ltd., 100.4 kgs., Rs. 59,643.

GUM ROSIN: From Hong Kong: Sigma Paints Ltd., 17.55 m.t., Rs. 1,30,403; From Finland: Hindustan Chemicals, 17.55 m.t., Rs. 1,26,880.

GUM ROSIN N. GRADE: From China: Ballarpur Industries Ltd., 49.95 m.t., Rs. 3,17,422; Panas Enterprise, 99,960 kgs., Rs. 5,88,553; Paulson Paint Cellulose Works, 35 m.t., Rs. 2,32,347; 35.10 m.t., Rs. 2,32,347; From Finland: Shree Ankeshwar Paper Mills, 17.55 m.t., Rs. 1,33,600.

GUM ROSIN W W GRADE: From China: Shubhayog Chemical Industries, 25.65 m.t., Rs. 1,62,999; From FRG: U.P. State Observatory, 18 m.t., Rs. 1,22,727; From Indonesia: Asian Paints (I) Ltd., 18 m.t., Rs. 1,14,386; Blue Bell Polymers P. Ltd., 18 m.t., Rs. 1,21,535; Resins & Plastics Ltd., 36.0 m.t., Rs. 2,33,538; From China: Shubhayog Chemical Industries, 8.55 m.t., Rs. 54,333.

GUAICOL TECHNICAL: From France: Syntho Kem: 2,400 kgs., Rs. 1,76,984.

HEXACHLORO CYCLOPENTADINE: From USA: Excel Industries Limited, 200 m.t., Rs. 47,27,325.

HEXACHLORO PENTADINE: From Japan: Videocon International Ltd., 40 m.t., Rs. 9,21,445.

HYDROGEN PEROXIDE 50%: From Spain: Rokadia Chemical Co. P. Ltd., 5 m.t., Rs. 45,013; Rokadia Chemical Co. P. Ltd., 7,100 kgs., Rs. 63,918.

8-HYDROXYQUINOLINE: From France: Usan Laboratories Ltd., 1,000 kgs., Rs. 1,81,394.

HYFLOSUPERCELL: From USA: Indian Dyestuff Industries, 6.53 m.t., Rs. 34,119; Uttamlal P. Ltd., 6.532 m.t., Rs. 34,119.

IODINE CRUDE: From Japan: Lub Cut Incorporation, 2,500 kgs., Rs. 5,95,762.

ISOOCYL THIOGLYCOLLATE: From FRG: A. L. A. Chemicals Ltd., 1,68,500 kgs., Rs. 7,80,793.

ISOPHTHALIC ACID: From Japan: Coats of India Ltd., 6.0 M. T., Rs. 77,846.00; Unisets Industries, 5.50 M. T., Rs. 71,505.

ISOPHYTOL: From FRG: E. Merck (I) Ltd., 3,740 kgs., Rs. 7,29,157.

ISOPROPYL ALCOHOL: From Taiwan: Medical Chemicals and Pharmaceuticals, 12.8 m.t., Rs. 1,11,844.

LABORATORY CHEMICALS: From UK: Sevantilal Mahasanthlal & Co., 170 kgs., Rs. 75,110.

LAURYL MYRISTYL ALCOHOL: From Phillipines: Hico Products Ltd., 5,775 kgs., Rs. 1,11,396.

LEVULINIC ACID: From Japan: Eskay Fine Chemicals, 500 kgs., Rs. 61,502.

LIQUID BROMINE: From UK: Indian Dyestuff Industries Ltd., 22.18 m.t., Rs. 4,25,708.

MALEIC ANHYDRIDE: From Japan: Bakelite Hylam Ltd., 17.50 m.t., Rs. 2,31,563; Everest Paint Industries, 17.50 m.t., Rs. 2,20,101; From Korea: Fibre Bond Industries, 8.75 m.t., Rs. 1,13,526; Hi Tech Industries, 8.75 m.t., Rs. 1,13,526.

MANCOZEB (TECH.): From Netherlands: Pesticides India, 12,000 kgs., Rs. 3,52,136.

META TOLUENE DIAMINE: From Japan: Colour Industries, 1,000 kgs., Rs. 32,568.

METHACRYLIC ACID: From Japan: Lubrizol India Ltd., 5,320 kgs., Rs. 1,62,464.

METHYL ETHYL KETONE: From UK: Garware Plastics & Polyester, 45,600 kgs., Rs. 5,19,187.

METHYL ISO BUTYL KETONE: From Taiwan: Bayer (I) Ltd., 26.4 m.t., Rs. 3,00,582.

MONOSODIUM GLUTAMATE: From Thailand: Gam Pharma, 850 kgs., Rs. 2,65,578.

NEOPENTYL GLYCOL: From FRG: Dr. Beck & Co. Ltd., 3 m.t., Rs. 63,906.

OCTOIC ACID: From Sweden: Brij Chem P. Ltd., 7.03 m.t., Rs. 1,04,240; Technoaid Products, 7,030 kgs., Rs. 1,01,262.

OCTYL PHENOL: From Japan: Dai Ichi Karkaria, 14,000 kgs., Rs. 3,12,583.

OLEYL ALCOHOL: From FRG: Kores (I) Ltd., 6.8 m.t., Rs. 2,15,163; Pepeya Insulation and Packaging Ltd., 6.8 m.t., Rs. 1,15,163.

OLEYL CETYL ALCOHOL: From FRG: I.E.L. Ltd., 13,600 kgs., Rs. 2,76,381.

DYES AND DYESTUFF INTERMEDIATES BOMBAY

(From 17-11-87 to 23-11-87)

(Cost of Imported Item is
CIF Value)

LEMON YELLOW GCN: To Indonesia: Atlas Dychem Industries, 2,000 kgs., Rs. 1,52,887.

MERCURIC OXIDE YELLOW ACS: To New York: United Phosphorous Ltd., 1,000 kgs., Rs. 1,30,800.

META CHLORO ANILINE: To New York: Kalyani Steels Ltd., 11,025 kgs., Rs. 6,44,694.

METANIL YELLOW: To Penang: Indian Dyestuff & Chemicals, 500 kgs., Rs. 21,682.

METHYL VIOLET: To Mombasa: Indian Products Trading Co., 1 kg., Rs. 1,55,000.

NAPHTHOL ASTR: To Liverpool: Amritlal Chemaux Ltd., 2,000 kgs., Rs. 3,10,111.

NAVINON BLUE BC: To New York: Indian Dyestuff Industries, 1,000 kgs., Rs. 3,04,904.

NAVINON GREY 2G: To New York: Indian Dyestuff Industries, 2,300 kgs., Rs. 7,88,509.

NAVINON OLIVE GREEN B: To New York: Indian Dyestuff Industries, 400 kgs., Rs. 1,00,362.

NAVINON YELLOW ART: To New York: Indian Dyestuff Industries, 1,000 kgs., Rs. 3,96,555.

6 - NITRO - 1 - DIAZO - 2 - NAPHTHOL - 4 - SULPHONIC ACID: To Hamburg: 10,005 kgs., Rs. 6,99,458.

ORGANIC PIGMENTS: To Bangkok: I.D.I., 640 kgs., Rs. 47,000.

ORGANIC SURFACE ACTIVE AGENTS: To Bangkok: Dyes & Dispersing Agent, 1,000 kgs., Rs. 20,000.

PARABASE SULPHURIC ACID ESTER: To New York: Metrochem Industries, 16,250 kgs., Rs. 9,09,384.

PATENT BLUE VS: To Sydney: Priya Chemicals, 300 kgs., Rs. 55,165.

PTHALOCYANINE GREEN GN: To Rotterdam: Colour Chem Ltd., 8,800 kgs., Rs. 12,28,595.

RAPID RED RH: To Jakarta: Tarang Dyestuff Industries, 1,500 kgs., Rs. 1,06,984.

REACTIVE BLUE: To Jakarta: Espee Chemicals, 5,000 kgs., Rs. 4,41,498.

REACTIVE BLUE 21: To Antwerp: Brinda Export Agencies, 5,000 kgs., Rs. 4,25,000; To Keelung: Space International, 5,000 kgs., Rs. 4,53,351.

REACTIVE DYES: To Keelung: Amritlal Chemaux Ltd., 1,000 kgs., Rs. 85,563.

REACTIVE TURQUOISE BLUE: To Tanjung: Chika Ltd., 1,000 kgs., Rs. 1,09,067.

REACTIVE TURQUOISE BLUE G: To Busan: Metrochem Industries, 1,000 kgs., Rs. 89,921.

REACTOFIX GREEN HGBL: To Rotterdam: Jaysynth Dychem P. Ltd., 425 kgs., Rs. 70,959.

REACTOFIX PURPLE HE3R: To Rotterdam: Jaysynth Dychem P. Ltd., 1,500 kgs., Rs. 3,72,514.

RED IRON OXIDE: To Manila: Bharat Pulverising Mills, 5,850 kgs., Rs. 6,209.

RED IRON OXIDE POWDER: To Busan: Industrial Minerals & Chemicals Co., 20,000 kgs., Rs. 31,064.

RED MERCURIC OXIDE: To New York: United Phosphorus Ltd., 50 kgs., Rs. 5,098.

RED OXIDE: To Melbourne: Industrial Minerals & Chemicals, 18,000 kgs., Rs. 22,418.

RED OXIDE COLOUR: To Manila: Bharat Pulverising Mills P. Ltd., 19,975 kgs., Rs. 25,940.

RED OXIDE POWDER: To Keelung: Bharat Pulverising Mills P. Ltd., 3,000 kgs., Rs. 3,768.

SCARLET 789: To Jakarta: Tarang Dyestuffs Industries, 1,000 kgs., Rs. 34,948.

SOLATIC BRILLIANT PURPLE: To Jakarta: M/s. Atil Industries, 200 kgs., Rs. 91,934.

SYNTHETIC COALTAR DYES: To Singapore: Patel Chemo Pharma P. Ltd., 1,000 kgs., Rs. 2,00,000; To New York: H. B. R. Chemicals Pvt. Ltd., 2,000 kgs., Rs. 1,08,265; To Felixstowe: Indian Dyestuff & Chemicals, 2,000 kgs., Rs. 8,142; To Jakarta: Hulf & Truste, 750 kgs., Rs. 62,582.

SYNTHETIC ORGANIC DYES: To Antwerp: Kantilal Sanghvi & Co., 1,000 kgs., Rs. 1,22,000; To Singapore: Amritlal Chemaux, 1,000 kgs., Rs. 86,333; To Tanjung: Amritlal Chemaux Ltd., 2,000 kgs., Rs. 1,77,767; To Sydney: Priya Chemicals, 500 kgs., Rs. 58,972; To Genoa: Priya Electronics & Chemicals, 2,400 kgs., Rs. 93,420; To Bangkok: Colour Chem Ltd., 600 kgs., Rs. 37,517.

SYNTHETIC ORGANIC DYE-STUFFS: To Antwerp: Karsandas Mauji, 5,000 kgs., Rs. 57,187.

SYNTHETIC ORGANIC DYE-STUFF CHRYSOPHENINE: To New York: 2,500 kgs., Rs. 2,54,097.

TURQUOISE BLUE G: To Busan: Bhoir Import Export P. Ltd., 1,000 kgs., Rs. 89,618.

VINYL SULPHONE: To Rotterdam: Liberty Exports P. Ltd., 21,390 kgs., Rs. 19,81,917; The Dharamsi Morarji Co. Ltd., 10.7 m.t., Rs. 6,10,252.

VINYL SULPHONE ORTHO-ANISIDINE ESTER: To Jakarta: Espee Chemicals, 1,100 kgs., Rs. 1,51,879.

YELLOW IRON OXIDE: To Manila: Bharat Pulverising Mills, 5,850 kgs., Rs. 6,209.

YELLOW OCHRE: To Manila: Bharat Pulverising Mills P. Ltd., 2,160 kgs., Rs. 25,940.

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SODIUMFORMATE	(Imported/Kanoria)

PARACETAMOL

IP/BP

CHEMICAL Formula

Acetaminophen

4' — Hydroxyacetanilide

P — acetylaminophenol

N — Acetyl p-aminophenol

P — acetaminophenol

P — acetamidophenol

STRUCTURAL Formula

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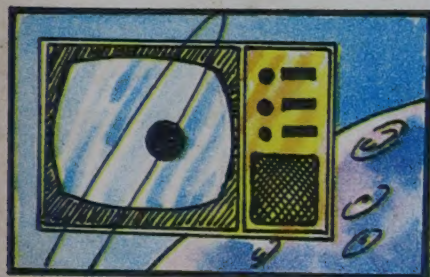
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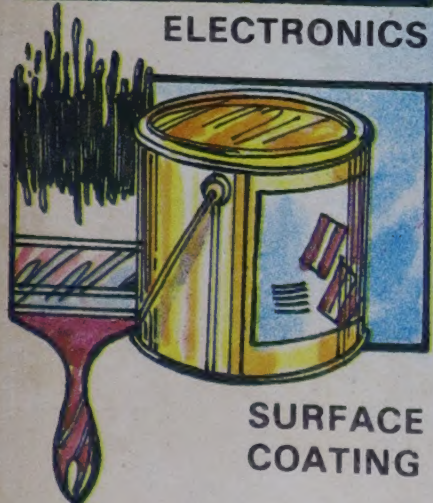
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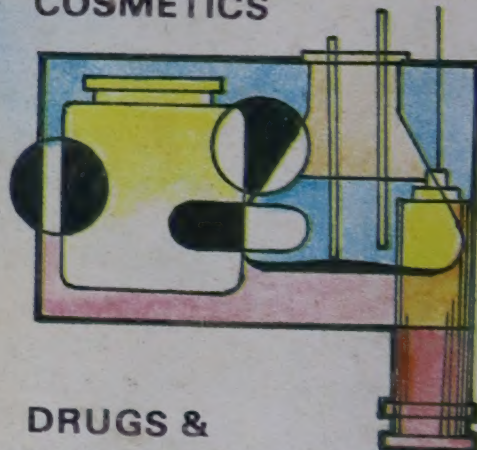
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